

# **Comprehensive Conservation Plan**

## **1. INTRODUCTION AND BACKGROUND**

This Comprehensive Conservation Plan (CCP) has been prepared for Ohio River Islands National Wildlife Refuge (Refuge). The CCP is a management tool to be used by the Refuge staff. It will help guide management decisions over the next 15 years, and set forth strategies for achieving Refuge goals and objectives within that timeframe. Overriding considerations reflected in the plan are that fish and wildlife conservation requires first priority in refuge management, and that wildlife-dependent recreation is allowed and encouraged as long as it is compatible with, or does not detract from, the mission of the National Wildlife Refuge System or purposes of the Refuge. This chapter discusses the following topics: a brief description of the Ohio River Islands National Wildlife Refuge and how it came into existence; the purpose of and need for the plan; the purpose and vision of the Refuge; the National Wildlife Refuge System mission, goals and guiding principles, including the legal context which guides management; and other relevant plans and partnerships that affect Refuge management.

This plan details program planning levels that are above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. This plan does not constitute a secure commitment for staffing increases, or funding for future refuge-specific land acquisitions, construction projects or operational and maintenance increases.

### **Refuge Overview: History of Refuge Establishment, Acquisition, and Management**

The Ohio River Islands National Wildlife Refuge was established in 1990 under authority of the Fish and Wildlife Act of 1956, and was the first Refuge in West Virginia. The Refuge (see Figure 1) currently consists of all or part of 21 islands and three mainland tracts in the Ohio River, encompassing 3,221 acres (Figure 2) of valuable fish and wildlife habitat within one of the nation's busiest waterways. As acquisition progresses, the Refuge may include up to 35 river islands. The acquisition focus area stretches nearly 400 river miles from Shippingport, Pennsylvania, to Maysville, Kentucky and includes four states (Pennsylvania, Ohio, West Virginia, and Kentucky).

In addition to the islands, one hundred embayments and wetlands adjacent to the mainland are within the approved boundary for the Refuge. These areas provide excellent fish and wildlife habitat and would be a valuable addition to the Refuge. Thus, the Refuge could potentially add over 8,000 acres of islands, wetlands, back channels and underwater habitat. The plans for additional land protection will be addressed in a future Land Protection Plan (LPP).

There are a total of 40 islands remaining in the Upper Ohio River. Twenty-one are part of the Refuge at the present time. These island habitats contain near natural assemblages of plants and animals that are endemic to the river. The distribution of bottomland and riparian habitats, and deep and shallow water aquatic habitats, make these areas

extremely beneficial to fish and wildlife species. A huge diversity of species (waterfowl, shore and wading birds, neotropical migratory land birds, furbearers, fish and benthic organisms, including freshwater mussels) find these areas invaluable for resting, feeding, nesting, spawning, and other necessary life functions. The deep and shallow water habitats associated with the islands are major fish and mussel production areas of the Ohio River. The often undisturbed island shorelines, especially the heads and backchannels, are favored sport fishing areas.

Over 200 bird species (76 of which breed there), 42 mollusk species, 15 species of reptiles and amphibians, 101 species of fish, 25 mammals, and 500 species of plants have been identified so far within the Refuge.

The shallow waters of the river provide quality habitat for freshwater mussels, including at least two federally endangered species, the pink mucket and fanshell. Bald eagles, peregrine falcons and Indiana bats also use the Refuge habitats. In addition, many species of plants and animals considered endangered, rare, or of special interest in the four states occur on the Refuge.

The Ohio River is rich in history, and many areas of historical and cultural significance are located on or adjacent to the islands. Some notable examples include early explorers' accounts of Native Americans and their culture, George Washington's survey expeditions, the use of the river as a major transportation route by early settlers and pioneers heading west, battles fought during the Civil War, and finally, use for navigation and industry.

<b>Parcel Name</b>	<b>Land</b>	<b>Underwater</b>	<b>Total</b>
<i>Phillis Island</i>	39	--	39
<i>Georgetown Island</i>	16.2	--	16.2
<i>Wheeling Island</i>	17.8	~30	47.8
<i>Paden Island</i>	80.8	46.9	127.7
<i>Williamson Island,</i>	125.6	128	261.7
<i>and Witten Towhead Island</i>	8.1		
<i>Crab Island</i>	0.6	7.2	7.8
<i>Wells Island</i>	43	81.4	124.4
<i>Mill Creek Island</i>	19	58.8	77.8
<i>Grandview Island</i>	8	85.7	93.7
<i>Grape/Bat Island</i>	44.5	70	114.5
<i>Middle Island</i>	235	91	326
<i>Broadback Island</i>	51	78.6	129.6

<i>Buckley Mainland</i>	<i>49</i>	<i>--</i>	<i>49</i>
<i>Buckley Island</i>	<i>160</i>	<i>75.7</i>	<i>235.7</i>
<i>Muskingum Island</i>	<i>93</i>	<i>167.3</i>	<i>260.3</i>
<i>Neal Island</i>	<i>104</i>	<i>121.6</i>	<i>225.6</i>
<i>Buffington Island</i>	<i>162</i>	<i>85.9</i>	<i>247.9</i>
<i>Letart Island</i>	<i>28.6</i>	<i>142.9</i>	<i>171.5</i>
<i>Manchester #1 Island,</i>	<i>20.4</i>	<i>315.3</i>	<i>429.3</i>
<i>and Manchester #2 Island</i>	<i>93.6</i>		
<i>Buffalo Creek</i>	<i>19</i>	<i>--</i>	<i>19</i>
<i>Captina Island</i>	<i>17</i>	<i>61.4</i>	<i>78.4</i>
<i>Captina Mainland</i>	<i>138</i>	<i>--</i>	<i>138</i>
<b>SUBTOTAL OF</b>			
<b>REFUGE OWNED PROPERTIES</b>	<b>1,573.2</b>	<b>1,647.7</b>	<b>3,220.9</b>

*\* Non-Refuge islands are presented in Figure 3 (page 35).*

Public uses of all types have occurred on and around the Ohio River Islands in recent years. The relatively undisturbed nature of many of the islands have made them popular areas for nature study, hunting, fishing, camping, picnicking, and pleasure boating. As islands are acquired for the Refuge, only those uses determined to be compatible with Refuge purposes will be allowed to continue.

Refuge management in the past has concentrated on preserving, restoring, and enhancing the diversity and abundance of fish and wildlife populations characteristic of the floodplain forests and wetlands of the Ohio River.

### **Purpose of and Need for Action**

The purpose of the plan is to provide overall guidance for the protection and use of the Refuge during the next fifteen years. Under the provisions of the National Wildlife Refuge System Improvement Act of 1997, the U.S. Fish and Wildlife Service (Service) is required to develop comprehensive conservation plans for all lands and waters of the Refuge System. The National Environmental Policy Act (NEPA) also ensured that the Service assessed the environmental impacts of any actions taken as a result of implementing the CCP.

This plan is also needed to:

- provide a clear statement of the desired future conditions for habitat, wildlife, facilities and people;

- provide Refuge neighbors and visitors with a clear understanding of the reasons for management actions on and around the Refuge;
- ensure that management of the Refuge reflects the policies and goals of the National Wildlife Refuge System;
- ensure the compatibility of current and future uses of the Refuge;
- provide long-term continuity in Refuge management; and
- provide a basis for Refuge operation, maintenance, and developmental budget requests.

## **Refuge Purpose**

The Fish and Wildlife Act of 1956 outlines the Refuge's primary purpose "*...for the development, advancement, management, conservation, and protection of fish and wildlife resources...*" "*...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services.*"

## **Refuge Vision Statement**

*The Ohio River Islands National Wildlife Refuge will create a linked network of over 12,000 acres of floodplain forests, wetlands, and aquatic habitat stretching over 400 miles from Pittsburgh to Cincinnati. These refuge lands and waters will fulfill the needs of fish, wildlife and plants that are native to "big river" ecosystems. Through reforestation, exotic species control, and wetland restoration, the Refuge will serve as an anchor for biodiversity and a model for habitat restoration throughout the Ohio River Valley ecosystem. We will forge habitat and management links with other units of the National Wildlife Refuge System.*

*The Ohio River Islands National Wildlife Refuge is committed to the preservation, conservation and enhancement of a quality river environment for the people of the Ohio River Valley. In this pursuit, we will work with partners to provide a wide range of environmental education programs and promote high quality wildlife-dependent recreational opportunities, to build a refuge support base and attract new visitors. Just as the Ohio River is an important corridor for transporting people and goods, it is also an important natural corridor for migratory birds, fish, and endangered freshwater mussels. Encouraging an understanding and appreciation for the "wild" Ohio will be a focus of the Ohio River Islands National Wildlife Refuge for generations to come.*

## **Legal and Policy Guidance**

This section presents hierarchically, from the national level to the local level, highlights of U.S. Fish and Wildlife Service policy, legal mandates, and existing resource plans which directly influenced development of the CCP.

*The U.S. Fish and Wildlife Service and its Mission*

National Wildlife Refuges are managed by the U.S. Fish and Wildlife Service, part of the Department of Interior. The mission of the U.S. Fish and Wildlife Service is:

*"...working with others, to conserve, protect and enhance fish and wildlife and their habitats for the continuing benefit of the American people."*

The Service has specific trustee responsibilities for migratory birds, threatened and endangered species, anadromous fish, and certain marine mammals, as well as for lands and waters administered by the Service for the management and protection of these resources.

### *The National Wildlife Refuge System and its Mission*

The Service's National Wildlife Refuge System is the world's largest collection of lands and waters set aside specifically for the conservation of wildlife and ecosystem protection. Over 530 National Wildlife Refuges covering over 92 million acres are part of the national network today. With over 77 million acres in Alaska and the remaining 15 million acres spread across the other 49 states and several island territories, over 34 million visitors annually hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretive activities on Refuges.

In 1997 the National Wildlife Refuge System Improvement Act (Refuge Improvement Act) was passed. This legislation established a unifying mission for the Refuge System, a new process for determining compatible public use activities on Refuges, and the requirement to prepare CCPs for each Refuge. The Refuge Improvement Act states that first and foremost, the Refuge System must focus on wildlife conservation. It further states that the national mission, coupled with the purpose(s) for which each Refuge was established, will provide the principal management direction for each Refuge.

The mission of the National Wildlife Refuge System is:

*"...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."* (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)

With regards to public use, the Refuge Improvement Act declared that all existing or proposed public uses must be "compatible" with each Refuge's purpose. Six wildlife-dependent public uses were highlighted in the legislation as priorities to evaluate in CCPs. The six uses are: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

### *Fulfilling the Promise*

This 1999 report resulted from the first-ever System Conference held in Keystone, Colorado in October 1998, and attended by every Refuge manager in the country, other Service employees, and leading conservation organizations. The report contains 42 recommendations packaged with three Vision statements dealing with *Wildlife and Habitat*, *People*, and *Leadership*. The recommendations in the *Fulfilling the Promises* report helped guide the development of goals and objectives in this draft plan.

Administration of National Wildlife Refuges is governed by various international treaties, federal laws, and regulations affecting land and water as well as the conservation and management of fish and wildlife resources. Policies for management options of the Refuge are further refined by the Secretary of the Interior and policy guidelines established by the Director of the U.S. Fish and Wildlife Service. As noted previously, the Fish and Wildlife Act of 1956 outlines the Ohio River Islands National Wildlife Refuge's primary purpose.

Key legislation affecting Refuge management includes:

- The National Wildlife Refuge System Improvement Act of 1997, which is the "organic" law for the System. The Act amends the National Wildlife Refuge System Administration Act of 1966.
- The National Wildlife Refuge System Administration Act of 1966, which authorizes the Secretary of the Interior to permit uses of a Refuge "whenever he determines that such uses are compatible with the major purposes for which such areas were established."
- The Refuge Recreation Act of 1962, which requires that any recreational use of Refuge lands can be an appropriate incidental or secondary use if it is practicable and not inconsistent with the primary objectives for which a Refuge was established, and that these uses not interfere with other previously authorized operations.
- The National Historic Preservation Act of 1966 and the Archeological Resources Protection Act of 1979, which provide for the protection and rehabilitation of historic and archeological resources that occur on any Refuge.

The Refuge Improvement Act establishes a mission for the System, policy direction, and provides significant guidance for management and public use for all units of the Refuge System. The act ensures that, for the first time, the public is formally involved in decisions on recreation and other public uses on units of America's 93 million acre National Wildlife Refuge System. The legislation requires the Secretary of the Interior to ensure that the mission of the Refuge System and purposes of the individual Refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the Refuge System. Continued growth of the Refuge System is to be planned and directed in a way that will contribute to conservation of the ecosystems of the United States.

The Act further stipulates that each comprehensive conservation plan "shall identify and describe:

(A) the purposes of each Refuge comprising the planning unit [*found in Chapter 1 of this document*];

(B) the distribution, migration patterns, and abundance of fish, wildlife, and plant populations and related habitats within the planning unit [*Chapter 3*];

(C) the archaeological and cultural values of the planning unit [*Chapter 3*];

(D) such areas within the planning unit that are suitable for use as administrative sites or visitor facilities [*Chapter 4*];

(E) significant problems that may adversely affect the populations and habitats of fish, wildlife, and plants within the planning unit and the actions necessary to correct or mitigate such problems [*Chapters 1,2 and 3*]; and

(F) opportunities for compatible wildlife-dependent recreational uses [*Chapter 4*]."

The legislation recognizes that compatible wildlife-dependent recreational uses are legitimate and appropriate public uses of the Refuge System. Several key terms are defined as follows:

*Compatible Use* - "...a wildlife-dependent recreational use or any other use of a Refuge that, in the sound professional judgement of the Refuge Manager, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the Refuge."

*Wildlife-dependent recreational use* - "...a use of a Refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation."

*Sound professional judgement* - "...a finding, determination, or decision that is consistent with principles of sound fish and wildlife management and administration, available science and resources, and adherence to the requirements of this Act and other applicable laws."

Appendix F contains a select list of summaries of other federal laws and treaties used for administration of the Refuge System and management of the Refuge. The Draft CCP, written inclusively as an Environmental Assessment (EA), was written to fulfill compliance with the National Environmental Policy Act.

#### *North American Waterfowl Management Plan*

This Plan documents the strategy between the United States, Canada, and Mexico to restore waterfowl populations through habitat protection, restoration, and enhancement. Implementation of the plan is at the regional level. Ten regional habitat "Joint Ventures" are partnerships involving Federal, State and provincial governments, tribal nations, local businesses, conservation organizations, and individual citizens. The Ohio River Islands

Refuge lies on the edge of the Atlantic Coast Joint Venture and the Mississippi Joint Venture. Three priority focus areas are already identified for protection (or enhancement) in West Virginia, totaling 40,550 acres. Both wetlands and adjacent uplands are part of the focus areas. Along the Ohio and Kanawha River Valleys, 6,550 acres have been identified. The Ohio Valley has been recognized as important for waterfowl by the West Virginia DNR, identified as one of the state's waterfowl focus areas for the Atlantic Coast Joint Venture.

The goal for the Atlantic Coast Joint Venture is:

*"Protect and manage priority wetland habitats for migration, wintering, and production of waterfowl, with special consideration to black ducks, and to benefit other wildlife in the joint venture area."*

### *Partners In Flight*

Of the 20 species on the West Virginia Partners in Flight priority Species List, at least 16 are known to nest along the Ohio River Valley. Osprey, which have been reintroduced into the valley by a cooperative effort of state, federal and private partners, are now nesting successfully along the Ohio River. The largest great blue heron rookeries in the state are also located within the Ohio River Valley.

The Partners in Flight Program is developing a plan for the area. The plan utilizes existing data to rank landbird species as to their priority for conservation. Habitat loss, landbird population trends, and vulnerability of species and habitats to threats are all factors used in the priority ranking of species. Further, the plan will identify focal species for each habitat type from which population and habitat objectives and conservation actions will be determined. This list of focal species, objectives and conservation actions will help direct landbird management on the Refuge.

### *Regional Wetlands Concept Plan*

In 1986, Congress enacted the Emergency Wetlands Resources Act to promote the conservation of our nation's wetlands. The Act directed the Department of Interior to develop a National Wetlands Priority Conservation Plan identifying the location and types of wetlands that should receive priority attention for acquisition by federal and state agencies using Land and Water Conservation Fund appropriations. In 1990, the Northeast Region of the U.S. Fish and Wildlife Service completed a Regional Wetlands Concept Plan to provide more specific information about wetlands resources in the Northeast. The Regional Plan identifies a total of 850 wetland sites that warrant consideration for acquisition, and also identifies wetland values, functions, and potential threats for each site.

### *Ohio River Valley Ecosystem Strategic Plan, 1999*



Throughout the last decade, the Service has been putting more emphasis into understanding how the parts of an ecosystem interrelate and affect the long-term conservation of natural resources. To this end, the Service has initiated new partnerships with private landowners, state and federal agencies, corporations, conservation groups, and volunteers. Implementing an ecosystem team approach to management has been a top national priority for the Service. Fifty-two ecosystem teams were formed across the country, typically using large river watersheds to define ecosystems. Individual ecosystem teams are comprised of both Service professionals and partners, who work together to develop goals and priorities for research and management.

The Ohio River Valley Ecosystem (ORVE) includes portions of ten states and straddles three Service administrative regions (Northeast, Southeast, and Mid-West). The Ohio River Valley Ecosystem Team is charged with the development and implementation of a strategic plan for conserving Service trust resources in the ORVE.

The following eight priorities have been identified, each encompassing numerous action strategies:

"In cooperation with partners...":

- reverse the decline of native aquatic mollusks within the Ohio River Valley Ecosystem with emphasis on endangered, threatened and candidate species and species of concern.
- reverse the decline and achieve stable, viable populations of migratory landbirds and other bird species of concern.
- reverse the decline of native fishes with emphasis on interjurisdictional, listed, and candidate species, and species of concern.
- protect and restore karst/cave habitat supporting listed and candidate species and species of concern.
- protect and restore wetland, riverine and riparian habitat in the Ohio River watershed for the protection and enhancement of migratory waterbirds and other wetland dependant species of concern.
- reduce the decline and promote the recovery of rare resources identified as listed/proposed threatened and endangered species, candidate species and species of concern [not otherwise addressed in the other Resource Priorities].
- achieve the necessary level of protection for those high priority areas within the Ohio River Valley Ecosystem that would help meet the goals of the ORVE Team.
- promote and support sustainable fish and wildlife-dependent recreational uses while maintaining the long-term health of the ecosystem and the Service's trust resources.

## **2. Planning Process**

The key to effective conservation begins with effective community involvement. To ensure that future management of the Refuge is reflective of the issues, concerns and opportunities expressed by the public, a variety of public involvement techniques were used.

- Open Houses and Public Information Meetings were held throughout the four states (Pennsylvania, Ohio, Kentucky and West Virginia) at 18 different locations during the spring and summer of 1998. Meetings were advertised locally through news releases, paid advertisements, radio broadcasts, and through our mailing list. For each town, the "open house" session was planned where people could informally learn of the project, and have their questions or concerns addressed in a "one-on-one" situation. The evening Public Information Meeting sessions usually included a slideshow presentation of the Refuge, a brief review of the Refuge System and the planning process, and a question and answer session. Participants were encouraged to actively express their opinions and suggestions.

- An "Issues Workbook" was developed to encourage written comments on topics such as wildlife habitats, exotic nuisance species, land protection, and public access to Refuge lands. These workbooks were mailed to a diverse group of over 1,200 people on our mailing list, given to people who attended a public meeting, and distributed to anyone who requested one. Through the workbook, we asked for public input on the issues and possible action options, on the things people valued most about the Ohio River, on their vision for the future of the natural resources, and on the Service's role in helping to conserve, protect and enhance fish and wildlife and their habitats.

- An internet site was developed which included an online Issues Workbook and schedule of upcoming meetings.

The Service mailed out and distributed a Planning Update in October 1998 which summarized responses to the Issues Workbook. The update represented the opinions of those who received, completed and returned the workbook. We also briefed local members of Congress on the input we had received.

The planning team held four workshops to identify and discuss management strategies to deal with issues pertaining to fisheries and fishing, public uses, and land protection. The diverse group of individuals and groups participating in the workshops included adjacent landowners, non-governmental organizations such as sportsmens groups and environmental organizations, state fish and wildlife agencies, state legislators, local businesses, and other interested and affected people.

The Draft CCP/EA was made available for public review and comment, providing the public another opportunity to discuss issues and offer solutions. We reviewed and considered all letters received. The Draft CCP/EA was originally released for 46 days of public review from February 13 to March 31, 2001, then extended an additional two

weeks to April 13.

We received numerous responses by way of oral testimony at public hearings or through submission of written or electronic documents. Comments were received from Federal and State agencies, local and national conservation and recreation organizations, and local residents. In the following section, we identify the issues raised and our response to those issues.

We also held four public meetings to solicit additional comments as follows:

- March 20, 2001 Community College of Beaver County, Monaca, PA
- March 22, 2001 Maysville Community College, Maysville, KY
- April 3, 2001 Historic Lafayette Hotel, Marietta, OH
- April 4, 2001 Parkersburg Municipal Building, Parkersburg, WV

Based on the analysis in the Draft CCP/EA, and our review of public comments, the Service has selected a Preferred Alternative. The Preferred Alternative basically includes all of Alternative B, the Proposed Action in the Draft CCP/EA, with a few modifications that are discussed in Chapter 4 of this document, and in our responses to comments. We also issued a Finding of No Significant Impact (FONSI). The FONSI establishes that our decision will not significantly effect the quality of the human environment and does not require preparation of an Environmental Impact Statement.

The CCP must be formally revised within fifteen years (or earlier, if it is determined that conditions affecting the Refuge have changed significantly). The plan will be monitored to ensure that the strategies and decisions noted within are accomplished. Data collected in association with routine inspections or programmatic evaluations will be used to continually update and adjust management activities.

## **Planning Issues**

A number of issues emerged during the planning process noted above. Some of the issues that are very important to people cannot be solved by the Service with this plan. Nevertheless, we have considered them throughout the planning process, and have developed a plan that may not resolve every problem, but would not worsen the problem either. These issues and concerns, voiced by the public during the scoping process, include:

- There is a perception by the general public of degraded water quality in the Ohio River, and that it therefore has a continuous and negative effect on the resources and use of the Refuge and other important habitat along the river. Some of the various types of pollution identified by the public included chemical/oil spills, untreated sewage discharge, illegal dumping, industrial discharges, and dredging and its associated release of contaminants into the water column. Non-point sources of pollution, including stormwater and agricultural runoffs, are a major

concern.

- Populations and diversity of fish appears to have declined over the last two decades.
- Increased motorized boating may contribute to shoreline and island erosion, and serve as a source of contaminant and trash pollution. An increased use of jet skis and water skiing also may disturb wildlife.

The following key issues were addressed in the Draft CCP/EA:

**Issue 1** - Erosion of islands and banks, and sedimentation and siltation of shallow water embayment areas (specifically) and the river (in general) adversely affect water quality and the general bottom habitat conditions for mussels and other benthic invertebrates and fish populations. Sand and gravel dredging also physically impact island stability, and could damage all culturally important islands.

**Issue 2** - Important fish and wildlife habitat in the Refuge area is not being adequately protected from the impacts of development or misuse. To date, the four states, as well as non-governmental organizations, have not shown ample commitment to acquiring these important habitats. The past, continuing and future loss of habitat (such as the removal of trees and vegetative cover along the river shoreline) also enhances erosion.

**Issue 3** - The introduction and spread of invasive plants and aquatic species on Refuge lands and in the Ohio River threaten native riparian vegetation and freshwater mussel species. Among the most recognized of these nuisance exotics are the plants "Japanese knotweed" and "mile-a-minute" as well as the zebra mussel. Invasive species cost our Nation's economy an estimated \$123 billion annually and are second only to habitat destruction in threatening extinction of native species.

**Issue 4** - Public access to the river (and therefore, the islands) is often difficult or inadequate. Loss of river access is due to a number of factors, including the continued development of waterfront facilities, land acquired for commercial, industrial, or residential purposes, barge repairs, and docking areas. There is also a need to increase Refuge opportunities for people without boats.

**Issue 5** - The four state resource agencies contend that the current hunt plan is unnecessarily and overly restrictive with regard to hunting methods and species which may be hunted. Although hunting opportunities are currently offered on Refuge lands and throughout the Ohio River Valley, the agencies would prefer the Refuge adopt all State regulations on current and future Refuge properties.

**Issue 6** - Environmental education is limited within the Ohio River area. There are significant educational and research opportunities on and around the islands. The opportunity to educate schoolchildren and the public about these interesting habitats

should be a primary thrust of the Refuge planning effort.

**Issue 7** - Despite current outreach efforts, public awareness of the Refuge is low. Generally, the public (and particularly the non-boating public) is unfamiliar with: the Refuge's existence, regulations, mission and goals; the recreational opportunities it has to offer; and the important resources that are being protected.

**Issue 8** - Existing staffing levels and Refuge facilities are inadequate to meet present and anticipated future needs of the Refuge. To effectively serve the public, additional staff and an office/visitor contact station would likely be required.

**Issue 9** - The Refuge currently does not have a trapping program. State resource agencies have expressed that they would prefer and advocate the use of trapping as a public use on Refuge lands.

### **3. Refuge and Resource Description**

The geographic area encompassed by the plan is Ohio River Mile 0 (Pittsburgh, Pennsylvania) to 437 (Meldahl Dam). This chapter describes the refuge and the natural and cultural resources associated with it.

#### **Physical Environment**

##### *Water Quality*

Present water quality in the study area is generally acceptable to good, with nearly neutral pH, good color, adequate dissolved oxygen (except for reduced levels just upstream of the locks and dams occasionally during the low flow months), and reasonably low iron and manganese concentrations. However, extensive periods of turbidity (due to high suspended sediment loads) and subsequent sedimentation of aquatic substrates is impacting both water and habitat quality. The principal cause of these problems is poor land management practices in the watershed (logging, mining, lack of buffer strips, removal of riparian habitat, agricultural runoff), both local and distant in nature. According to the Ohio River Valley Sanitation Commission, concentrations of pesticides, organic compounds, and heavy metals in fish flesh have dramatically decreased in the last ten years; however, recent data has revealed possible contaminants present in fish in certain Ohio River segments. Fish consumption advisories are in effect for all four states. Water quality continues to improve and is presently able to support a viable aquatic community.

##### *Topography/Soils*

The study area lies almost entirely within the Appalachian Plateau Physiographic Province except the extreme lower portion (containing only three islands) which is located in the Interior Low Plateau Physiographic Province. The average width of the Ohio River varies from 1,450 feet near the upper end to 1,600 feet near the lower end of Meldahl Dam.

The alluvial sediments in the study reach consist of glacial outwash fill of sand and gravel. These glacial outwash deposits are as much as 125 feet thick. They are composed primarily of sand and gravel derived from local Pennsylvanian and Permian age sedimentary rocks. Other sand and gravels are composed of granite, quartzite, vein quartz, and chert glacially transported from Canadian sources. Most of the river in the study reach flows on this alluvial outwash plain.

The islands were formed by accretion of flood deposits over gravel and rock bars to the height of the floodplain. Certain land use practices (e.g., mining, farming, and timbering) have resulted in extensive erosion in the last century along some mainland and island shorelines.

Most soils on floodplains and islands are classified as fine sandy or silt loams of the Huntington, Chagrin, and Linside series. The Huntington and Chagrin soils are very well drained while the Linside series are classified as moderately well drained and somewhat poorly drained soils. A small amount of poorly drained Melvin silt loam is located in the study area, primarily on Blennerhassett and Grape Islands and on the mainland of Boaz Swamp.

### *Geology/Hydrology*

The Ohio River begins at the confluence of the Allegheny and Monongahela Rivers at Pittsburgh, Pennsylvania. The Monongahela River rises in northcentral West Virginia and the Allegheny River rises in southwestern New York. The 437 mile study reach of the Ohio River begins at Pittsburgh, forms the border of West Virginia and Kentucky with Ohio, and ends at the Meldahl Lock and Dam. The first 300 river miles portion of the study reach flows in a southwest direction and turns in a westerly direction at the Kentucky-West Virginia border for the last 140 miles. The river in the study reach falls approximately 0.44 feet per mile. The study reach traverses 12 navigation pools on the Ohio River. These are, in descending order: Emsworth, Dashields, Montgomery, New Cumberland, Pike Island, Hannibal, Willow Island, Belleville, Racine, R. C. Byrd, Greenup, and Meldahl.

The Ohio River flows down a very gently sloping plateau consisting of almost horizontal sedimentary strata of sandstones, shales, and limestone. The bed of the Ohio River, as mentioned earlier, is covered by deep alluvial deposits composed mainly of sand and gravel. Some of these deposits have been dredged for commercial purposes. The base of all but two of the islands (Eureka and Letart whose bases are composed of bedrock) in the study reach is composed of sand and gravel capped with sediments deposited by flooding. Commercial sand and gravel operations (instream and land-based) also occur throughout

the study reach.

There are two major sources of groundwater in the study area. Most of the groundwater immediately adjacent to the Ohio River is recovered via induced river discharge from the glacial deposits over which the Ohio River flows. The second source is found in the bedrock beneath the alluvial deposits and soils. Eureka, Middle, Neal, and Blennerhassett Islands have established water wells for industrial and municipal use. Gas, oil, and salt brine are also recovered from the underlying bedrock. For example, many islands contain the remnants of some old oil drilling operations. Gas/oil operations are presently confined to the low terrace and floodplain of the study reach, primarily in the Willow Island and Belleville navigation pools.

The immediate floodplain and all of the islands have flooded numerous times, as evidenced by extensive sediment layers over their sand and gravel cores; however, the extent and frequency of flooding on the Ohio River has been reduced by numerous tributary and headwater reservoirs.

It is important to note that the Ohio River is a greatly altered ecosystem, impounded for navigation purposes. The altered hydrology has affected significantly the quality of both aquatic and terrestrial habitats. Many islands, shallow gravel bars, riffles, and channel wetlands have been lost, and have been replaced by deepwater habitats. Impoundment of the river and resulting elevated water table has altered the plant community composition of the riparian corridor - favoring a silver maple dominated forest.

#### *Air Quality*

Most areas of the Refuge and the surrounding lands currently meet federal air quality standards for the six "criteria pollutants", which are ozone, carbon monoxide, sulfur dioxide, particulates, lead, and nitrogen oxides. Nonattainment areas (defined as an area that does not meet national primary or secondary ambient air quality standards, or that contributes to ambient air quality in a nearby area that does not meet standards) are located in Beaver County, Pennsylvania (part of the Pittsburgh-Beaver Valley ozone nonattainment zone) and in Boyd County, Kentucky.

There are no Class I areas (i.e., where air quality standards are stricter because of outstanding visual resources) near any portion of the Refuge. The Refuge is designated as a Class II area, and is protected under the Clean Air Act. It is identified for less stringent protection for air pollution damage than a Class I area, except in specified cases. Hundreds of other airborne chemicals may be toxic or hazardous, but are not subject to ambient standards under state or federal law.

#### **Nonattainment Areas**

City/State	County	1-hour O <sub>3</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>	Pb	NO <sub>2</sub>
Pittsburgh, PA	Allegheny	X		X	X		

Wheeling, WV	Ohio						
Parkersburg, WV	Wood						
Huntington, WV	Cabell						
Ashland, KY	Boyd			X			

## Biological Environment

The Service classifies the islands and associated aquatic, wetland, and bottomland habitats as Resource Category 1 under our Mitigation Policy. By definition, the island habitats are of high value for the evaluation species and are unique and irreplaceable on a national basis or in an ecoregion section. Aquatic habitats associated with the islands and their back channels comprise less than one percent of the open water acreage of the Ohio River in the study reach. However, these areas provide some of the region's highest quality riverine, wetland, and bottomland habitats and are used by migratory and resident waterfowl, shorebirds, songbirds, raptors, wading birds, warmwater fishes, and freshwater mussels. Because there is no longer any glacial transport of sand, gravel, cobble, and boulders which formed the islands, and because of the current navigation system, new islands will not be created. For the same reasons, there will be no significant natural maintenance of existing islands. They are irreplaceable.

### *Terrestrial Habitats*

Along the floodplains of the Ohio River in this region, bottomland hardwood forests are the natural climax community. Much of this habitat type has been eliminated by industrial, residential, and agricultural development. The remaining riparian area is often less than a few hundred feet in width. This habitat type has the classic four layered plant structure. Dominant tree species in the overstory are silver maple, sycamore, cottonwood, and black willow; minor trees include slippery elm, pin oak, river birch, sweet gum, and hickories. Representative species in the lower canopy include: hackberry, black locust, American elm, green ash, box elder, pawpaw, buckeye, and black walnut. Shrubs include spice bush, Virginia creeper, poison ivy, dogwoods, black elderberry, and grape species. Herbaceous density and diversity of ground cover varies with the amount of light penetration. Typical ground cover includes wingstem, touch-me-nots, white snakeroot, and a profusion of invasive exotic plants (Japanese knotweed, garlic mustard, mile-a-minute, Japanese hops, and kudzu).

This floodplain forest community provides good habitat for furbearers such as beaver and cavity nesting species such as wood duck, pileated woodpecker, prothonotary warbler, fox squirrel, and raccoon. It also provides the proper canopy structure and insect life required to support other migratory songbirds like the warbling vireo, yellow-billed cuckoo, northern oriole, over 25 species of warblers, and many species of bats. Mature trees provide roosting and nesting habitat for piscivorous birds, such as osprey, bald eagle, and herons. Understory provides habitat for species such as white-footed mice, white-tailed deer, Carolina wren, and wood thrush. Because these areas are often interspersed with aquatic habitat types, they are of immense value to wildlife.



The other major terrestrial habitat type occurring throughout the planning area is oldfield. Very little active agricultural lands occur within the acquisition area. The early successional habitats were farmed, grazed, or otherwise disturbed in the recent past by oil and gas activities, recreational development, logging, and abandoned industrial sites. These fragmented oldfield habitat blocks are comprised of mostly herbaceous species and grasses (goldenrods, mustards, thistle, reed canarygrass, bindweed, ironweed, joe-pye weed, ragweed, asters, and pokeweed) with some woody species beginning to take hold (blackberry, raspberry, rose, false indigo, dogwoods, and black elderberry). Numerous mammals (white-tailed deer, cottontail rabbit, ground hog, deer mouse, meadow vole) and migratory birds (American goldfinch, sparrows, yellow-breasted chat, swallows, blue-winged warbler, common yellowthroat, willow flycatcher, northern harrier, and owls) use this habitat type.

The riparian edge/shoreline areas along the islands provide important habitat for a number of wildlife species dependent on this limited habitat type, such as belted kingfisher, spotted sandpiper, bank swallows, killdeer, mink, muskrat, river otter, and a variety of amphibians, reptiles and insects (including some rare species of tiger beetles).

There are a total of 40 islands remaining in the upper Ohio River. Twenty islands are part of the Refuge at the present time. These island habitats contain near natural assemblages of plants and animals that are endemic to the river. The interspersed of bottomland and riparian habitats, and deep and shallow water aquatic habitats makes these areas extremely valuable to fish and wildlife species. Waterfowl, shore and wading birds, raptors, neo-tropical migratory land birds, furbearers, fish and benthic organisms, including freshwater mussels, find these areas invaluable for resting, feeding, nesting, spawning, and other necessary life functions. The deep and shallow water habitats associated with the islands are major fish and mussel production areas of the Ohio River. Additionally, the often undisturbed island shorelines, especially the heads and backchannels, are favored sport fishing areas. Over 200 bird species (76 of which breed there), 42 mollusk species, 15 species of reptiles and amphibians, 101 species of fish, 25 mammals, and 500 species of plants have been identified so far within the Refuge.

#### *Wetland Habitats*

Prior to impoundment, the Ohio River was a relatively shallow river (the average depth in summer was less than one foot), with numerous islands, gravel bars, channel wetlands (riverine emergent, and riverine aquatic bed), and adjacent overflow sloughs surrounded by bottomland hardwood forests. Impoundment of the river for navigation interests has created primarily deepwater habitat along the main channel corridor (average depth in channel 20 to 30 feet, with a maximum of 50 feet) and many islands, shallow bars, and channel wetlands have disappeared. Most of the remaining shallow water and wetlands in the floodplain occur in the embayments - the drowned tributary mouths inundated by backwaters from the impounded Ohio River. Think of the embayments as "displaced wetlands," situated off the main channel and up into the tributaries.

Major wetland habitat types and dominant plant species (if any) in the embayments and

along the mainland wetlands include:

- **riverine open water** (deep water, mudflats, and exposed cobble/gravel);
- **riverine emergent** (water willow, American lotus, lizardtail, bullhead lily, arrowhead, horsetail, arrow arum, yellow iris);
- **riverine aquatic bed** (water celery, pondweeds, milfoils, duckweed, Elodea sp., coontail, naiads);
- **palustrine open water** (deep water and mudflats, cut-off from flow);
- **palustrine emergent** (smartweeds, wild millet, cattail, sedges, rushes, sweet flag, bulrushes, wild rye, rice cutgrass, false nettle, spike rushes, swamp milkweed, sensitive fern, swamp rose mallow, burreed, marsh purslane, monkeyflowers, vervains, spotted and pale touch-me-nots, boneset, cardinal flower, begger-ticks, loosestrife, seedbox, bedstraw, bugleweed, water horehound, tickseed sunflowers, black elderberry, St. Johnswort, moneywort, ditch stonecrop, primrose willow, and dodder);
- **palustrine scrub/shrub** (black willow, brookside alder, buttonbush, dogwoods, false indigo, sandbar willow, swamp rose); and,
- **palustrine forested** (black willow, eastern cottonwood, sycamore, slippery elm, silver maple, American elm, river birch, green ash, pin oak, hackberry).

In the Refuge planning area, there are approximately 5,500 acres of relatively undisturbed embayments and mainland wetlands affected by the Ohio River backwaters which have some significance to fish and wildlife. The physical characteristics and values of the embayments vary throughout the years and seasons. In summer, during the height of the growing season, the diversity of wetland plants and habitat types provide excellent food and cover for migratory and resident wildlife. The shallow water habitats are important feeding areas for wading birds such as great blue herons, great egrets and black-crowned night herons - especially for those which nest in rookeries nearby and feed in the embayments while raising their young. After fledging, juvenile herons concentrate in the embayments as well. Wood ducks, mallards, and Canada geese raise their broods in the embayments and along the mainland wetlands in summer. Young-of-year fishes find shelter in the riverine aquatic bed and emergent wetlands. The embayments are important nursery areas for Ohio River fishes, particularly bass and sunfish. The embayments also support an abundance of amphibians and reptiles (snapping turtles, spiny-softshell turtles, painted turtles, map turtles, northern water snake, bull frog, leopard frog, green frog, pickerel frog, grey tree frog, spring peeper, fowler's toad, American toad), as well as at least 19 species of mussels.

Fall generally brings lower water levels in the embayments, exposing mudflats and invertebrates as well as aquatic plants to feed migrating shorebirds, wading birds and waterfowl. Native wildlife food plants such as smartweeds, bulrushes, wild rye and millet

lie down and become available to migratory birds and other wildlife. Soft mast-producing trees and shrubs dominate in the embayments (elderberry, cherry, spicebush, hackberry, grape, dogwoods), providing abundant food for migratory landbirds en-route to their southern destinations.

During the winter, the emergent wetland vegetation in the embayments lays down and dies back, but much submerged aquatic vegetation and rootstocks remain as important food for wintering waterfowl and muskrat. While high water and swift currents are common on the main river in winter, the embayments provide quiet resting places off the main river for fish and wildlife to conserve energy. Over 25 species of waterfowl (ducks, geese, swans, mergansers) and other waterbirds (loons, grebes, and gulls) rest and feed in the embayments in winter as long as they remain ice-free. Bald eagles are more abundant in winter than at other times of the year along the river and in the embayments, as they shift south off frozen lakes and rivers in the north, and find abundant food and occasional large roosting trees along the river.

Spring comes to the embayments earlier than the main river, as the shallow waters warm up faster. Those bottomlands which were flooded in winter "green up," and exposed mudflats again nourish migrating shorebirds and wading birds. Herons and waterfowl begin to nest as early as March. Neotropical migratory landbirds also return to nest, including warblers, thrushes, vireos, cuckoos, flycatchers, and tanagers. Many more species pass through on their journey back to their northern breeding range, stopping and feeding on late fruits, early seeds, and abundant insects.

### *Aquatic Habitats*

The sand, gravel, and cobble beaches which typify most of the islands are good indicators of the river substrates which extend from the islands down into the depths of the river. Different substrate types are associated with the islands, including sand, gravel, cobble, boulder, emergent and submerged stumps and logs, other detritus, silt, clay, muck, and emergent and submerged riverine aquatic beds. The substrate type in a particular location is a function of the current velocity and current pattern. Sand, gravel, and cobbles are predominately associated with island heads and shorelines where high current velocities keep these coarser substrates swept clean of the fine materials. With the exception of those areas which lie directly downstream of locks and dams, the heads of the islands more closely resemble a natural riffle/run habitat which was a major characteristic of the Ohio River prior to impoundment.

During those years when environmental conditions are suitable, large expanses of submerged aquatic beds extend along the shorelines of the islands, out to a depth of approximately four feet. Shorelines along an inside bend, backchannel shorelines, and toes of islands are usually a combination of softer substrates-sand, silt, clay, and detritus. Submerged and emergent logs and stumps may accumulate in depositional areas.

In general, the aquatic habitats adjacent to and surrounding the islands are dominated by hard substrates (gravel, cobble, and boulder). At the present time, over 100 species of fish

and over 40 species of native freshwater mussels inhabit the aquatic habitats adjacent to the island Refuge. The backchannel habitats of the islands (approximately 1,500 acres) have a greater degree of protection from natural and human induced disturbances, such as erosive currents, wind, and commercial navigation.

### *Fish and Wildlife*

A complete listing of all birds, freshwater fishes, mollusks, mammals, reptiles, amphibians, and flora known to exist within the Refuge's study area are listed in Appendix D. These listings include: the family that each identified species belongs to; scientific names and common names; the current status of the species; and whether or not the species is native to the area.

The **birds** of the Refuge are probably the most conspicuous group of wildlife, in terms of their numbers, visibility, and overall diversity of species. Over 200 species of birds have already been recorded using the Refuge at some time during the yearly cycle of seasons (Appendix D). The Refuge provides different habitat requirements for birds at different times of the year. By and large, the most abundant group of birds are migrants (143 species). These are birds which spend part of the year elsewhere, but come to the Refuge either to breed in the summer, spend the winter, or merely pass through (feeding and resting) during the spring and fall. Only 44 species of birds are considered year-round residents on the Refuge, and six species are "accidental tourists."

Migratory landbirds (such as warblers, vireos, cuckoos, tanagers, thrushes, orioles, and flycatchers) spend the winter in Central or South America but migrate up through the Ohio River Valley in spring en route to their breeding grounds, either on the Refuge or points farther north. Many go as far north as Canada and the Arctic, and then back south again in the fall. The Ohio River corridor is poised on the boundary between the Atlantic and Mississippi flyways, and is a major migration route for birds. **Migratory birds** are the dominant breeding birds on the Refuge. To date, 78 species are known to nest on the Refuge, and the most abundant nesters include grey catbird, wood thrush, song sparrow, yellow warbler, common yellowthroat, northern cardinal, yellow-breasted chat, American robin, common grackle, acadian flycatcher, Carolina wren, red-eyed vireo, American redstart, Carolina chickadee, Eastern towhee, American goldfinch and white-eyed vireo. **Of the 20 species of concern identified by the West Virginia Partners in Flight team, 15 are known to nest on the Refuge.**

**Water birds** heavily use the floodplain habitats of the Refuge. Herons, egrets, ducks, geese, swans, loons, grebes, gulls, terns, shorebirds, osprey, and bald eagles are common along the islands and in the embayments, and are much more easily seen out in the open than some of their smaller and more secretive colleagues. Nesting water birds include great blue heron, green heron, osprey, wood duck, mallard, American black duck, Canada goose, killdeer, spotted sandpiper, belted kingfisher, and herring gull. The remaining species of water birds are found on the Refuge during migration, or, in the case of most waterfowl (25 species) and the bald eagle, primarily in the winter. The Refuge monitors the nesting activities of osprey and great blue herons on the Refuge. The mean number of

osprey young hatched since 1995 on Neal Island is 2.5, and the average number of young fledged is 2.0. Great blue heron rookeries occur on Grape, Fish Creek and Muskingum Islands, and are expanding onto mainland areas and new islands. In 1992, there were 245 active heron nests on two islands, and the average number of young fledged per nest was 2.3. In 1999, there were 200 nests spread out among four islands.

Many **raptors** on the Refuge are year-round residents, such as the great horned owl, eastern screech owl, barred owl, red-tailed hawk, cooper's hawk, sharp-shinned hawk, American kestrel, broad-winged hawk, and red-shouldered hawk. Other birds of prey visit the Refuge only during migration or winter, such as the merlin, peregrine falcon, northern harrier, and rough-legged hawk. There is an abundance of small mammals and birds which serve as food for the raptor populations.

To date, 25 species of **mammals** have been documented on the Refuge (Appendix D). The general hydrologic characteristics of the islands, which includes regular flooding, dictate that ground-dwelling mammals must be primarily transient in nature (in other words, good swimmers), or able to climb trees. The most commonly observed mammals include white-tailed deer, fox squirrel, raccoon, muskrat, beaver, opossum, red fox, woodchuck, and eastern cottontail rabbit. The larger mammals are seen frequently swimming back and forth between the islands and the mainland. The small mammal populations include five species of bats, meadow vole, short-tailed shrew, meadow jumping mouse, white-footed mouse and deer mouse. Riparian fur bearers, such as mink, muskrat and beaver, are noticeably more abundant along the back channels and wetland habitats of the embayments than along the main channel/navigation sides of the islands.

The distribution of mammals on the Refuge is heavily influenced by habitat type. Nearly 60% of the Refuge is now bottomland hardwood forest (up from 38% in 1981). As the habitats change, the mammal populations will respond with a shift towards the forest community and away from the old field community. Although most of the mammals are considered residents, bats in particular migrate long distances from their winter hibernacula in caves to their summer range along the Ohio River. The endangered Indiana bat has been documented in riparian forests adjacent to the Refuge, within Wayne National Forest.

Due to problems with access, the **reptile and amphibian** fauna of the Refuge has not been well studied. Existing information for herpetofauna is merely presence or absence on a county basis, with no information on relative abundance. To date, Refuge staff have documented 15 species of reptiles and amphibians on the Refuge, but this information is merely a beginning (Appendix D). The wetland habitats on and around the islands, and within the embayments and mainland wetlands, provide suitable habitat for a variety of amphibians, including American toad, Fowler's toad, green frog, bullfrog, gray tree frog complex, northern spring peeper, pickerel frog, and northern leopard frog. No salamander information is available.

Snakes in general are not abundant on the islands, primarily because of the tendency of the islands to flood regularly - snakes which might den or overwinter on the islands

would probably not survive a winter flood event. However, the occasional garter snake or black rat snake is seen on the Refuge, and northern water snakes swim to and from the islands.

Four species of turtles have been recorded on the Refuge so far - the terrestrial eastern box turtle, and the more aquatic snapping turtle, midland painted turtle, and eastern spiny softshell turtle.

Over 100 species of warm water fishes inhabit the Ohio River which flows through the Refuge (Appendix D). The islands provide a variety of habitat types for the diverse **fish** fauna - shallow gravel and sand bars, aquatic beds, overhanging cover, logs and snags, as well as large rock and cobble. Riverine emergent and submerged wetlands teem with young-of-year fishes. However, the deep water habitats are very difficult to sample effectively. Fishes are sampled primarily by State Natural Resource agencies in lock rotenone surveys, nearshore electrofishing, and shallow water seining. Many pelagic fishes and those which dwell in deep water along the bottom are often missed. Refuge divers have noted numerous species of darters, minnows, and madtoms in 20 feet of water, yet they are hard to collect.

The Ohio River along the Refuge supports a diverse recreational fishery, highlighted by spotted, smallmouth and largemouth bass, white and hybrid striped bass, channel and flathead catfish, sauger, walleye, black and white crappie, and freshwater drum. There is currently no commercial fishery in the Ohio River adjacent to West Virginia, Ohio or Pennsylvania.

**Mollusks** on the Refuge include **freshwater mussels** (the most diverse group), aquatic snails, and terrestrial snails. There are currently 50 species of freshwater mussels remaining in the Ohio River today, and 38 of these have been collected on the Refuge so far (Appendix D). Historically, there were upwards of 80 species in the free-flowing Ohio River, but habitat changes over the past 100 years have resulted in the extinction of at least 3 species, and the extirpation of many more. In addition to the habitat and water quality problems which mussels have faced, add the new threat caused by the invasion of the exotic zebra mussel. Zebra mussels first entered the Refuge in 1993, and since that time, their density has exploded to 13,000 animals per square meter. Zebra mussels compete with native mussels for food and oxygen, interfere with their reproduction, and encrust native mussels so heavily that the native mussels cannot open and close their shell, burrow, or move effectively. It's easy to see why freshwater mussels are the most imperiled group of animals on the Refuge.

Every Refuge island has been surveyed at least once, and each one has some mussel fauna associated with the underwater habitat surrounding it. At least two federally endangered mussels occur on the Refuge (pink mucket and fanshell) in the Belleville, Racine, RC Byrd, and Greenup pools. The most diverse mussel bed is found at Muskingum Island, with 28 species and an average density of 12 live mussels per square meter. Mussels generally require clean-swept sand, gravel, cobble and boulder habitat, and well oxygenated and nutrient rich waters. These habitats are abundant around the

islands.

Commercial harvest of mussels (primarily for the cultured pearl industry) is generally permitted in Kentucky waters, but not in the states of Pennsylvania, Ohio or West Virginia. However, there are sanctuaries in place adjacent to the Kentucky Refuge islands which prohibit commercial harvest from those areas.

The snail fauna of the Refuge are not as well known as their bivalve cousins. Two species of terrestrial snails have been found on the Refuge so far, and their distribution is restricted to islands. The aquatic snails in the upper Ohio River are not as diverse as in the lower 500 miles, and those that remain are impacted by the zebra mussel as well.

#### *Rare, Threatened, and Endangered Species*

Four federally listed species are known to inhabit the Refuge planning area: bald eagle, Indiana bat, pink mucket pearly mussel, and fanshell mussel. The bald eagle is most common during the winter months (November through March), but some have been seen throughout the summer. The Indiana bat spends winters in cave systems far from the Refuge, but inhabits the Ohio River in summer. The pink mucket and fanshell mussels, on the other hand, are year-round residents in the riverbed.

Numerous species of flora and fauna occur on the Refuge which are considered rare, threatened, endangered, or of special interest by the states of Pennsylvania, West Virginia, Ohio and Kentucky. Appendix D contains complete lists of plants and animals documented thus far on the Refuge, along with their current status under federal or state guidelines. At the present time, the Ohio River Islands Refuge is home to 45 species of special status birds, 33 special status fish, 31 special status mollusks, six species of special status terrestrial vertebrates, and 39 species of rare plants.

The peregrine falcon (*Falco peregrinus*) (formerly listed as endangered) has recently expanded its range and migrates through the Ohio River Valley in fall and spring. In August 1999, the Service removed the peregrine falcon from the list of endangered and threatened species, removing protections provided to the species. However, section 4(g)(1) of the Endangered Species Act requires implementation of a monitoring program for a minimum of five years. The Service has decided to monitor the peregrine falcon for 13 years, to provide data that will reflect the status of at least two generations of peregrines. If it becomes evident during this period that the peregrine is not maintaining its recovered status, the species could be relisted. The peregrine continues to be protected by the Migratory Bird Treaty Act, which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Department of the Interior.

#### **Socioeconomic Environment**

The largest cities along the Ohio River's banks are Pittsburgh, Pennsylvania; Cincinnati, Ohio; and Louisville, Kentucky. All three of the cities grew in the 1800s, largely through

use of the river as a transportation route. Today, the river remains an important commercial artery. In 1999, the Port of Pittsburgh was ranked the 11<sup>th</sup> largest port in the United States and the largest inland port in the country. Most shipping today is of bulk products, primarily coal, which is mined in all of the states bordering the Ohio, loaded onto barges near the mines, and carried to electricity-generating plants along the river. Gravel and petroleum products are also transported.

Many of the larger (and more visited) islands in the Refuge's boundary are clustered around the Parkersburg, West Virginia and Marietta, Ohio area. The counties of these two cities (Wood County and Washington County, respectively) comprise the metropolitan area of over 149,000 people.

### *History/Archaeology*

A 1998 geological and archeological assessment of the Ohio River Islands Refuge was able to classify the islands into three general types:

- Islands with sediments having recent origins not likely to contain prehistoric archaeological sites;
- Islands with Holocene sediments likely to contain historic artifacts close to the surface and deeply buried prehistoric sites; and
- Islands which contain a core area of Pleistocene sediments, overlaid by shallow Holocene age sediments which are likely to contain prehistoric and historic resources closer to the surface (Diamanti 1998).

The processes of island formation have direct implications for the potential of archaeological resources within the soils of the Refuge islands. Because we now understand the processes that formed the islands within the Refuge area, we can better manage archaeological resources and better predict which islands are more likely to have archaeologically sensitive areas. Island formation is also relevant to what kinds of prehistoric sites could exist on the individual islands. For example, if an island only contains late Holocene sediments (i.e. 4,000 years before present (BP) to present), then Paleoindian and Early Archaic sites would not exist on that island. [More detailed information on the archeology of the area can be found in Appendix B.]

While French and British fur traders frequented the valley in the 18th century, the first extensive Euro-American settlement in the Ohio River valley began around 1790. The search for good agricultural land was the major impetus to westward migration and lands suitable for cultivation were quickly claimed. Farm products such as grain, tobacco, livestock and distilled liquor were the first produced for market. Settlement progressed rapidly in some areas and the population became sufficient in 1803 for Ohio to achieve status as America's seventeenth state.

The river was the major route for transportation of goods and inflow of settlers. Taverns and mercantile exchanges were established along the shore. River pirates occupied some of the region's many islands, preying upon travelers and slow-moving steamboats.



Shallow fords between some islands also enabled some African slaves to escape to the free soil of Ohio. They were also used by participants of the Battle of Buffington Island, during Morgan's retreat to West Virginia.

Throughout the nineteenth century, the region felt the afflictions of the Civil War and the development of the Industrial Revolution. In the twentieth century, the Ohio River itself was transformed by human engineering. The level of the river has been raised by a set of locks and dams. The fords and portions of the Refuge islands that were above the water during the prehistoric and early historic periods are now inundated.

The islands figure prominently in the early explorers' accounts of prehistoric and contemporary Indians, George Washington's surveying expeditions, the settling of the Ohio River by pioneers and traders, strategic battles during the Civil War, and river exploitation for navigation and industry. Islands were once more numerous than they are today. In the early 1900's, there were 60 islands within the planning area (437 miles). With the advent of industrialization and modern improvements for navigation, 20 islands were lost and, apparently one (Lesage Island), was created:

#### **Ohio River Islands in the Planning Area No Longer Existent**

Line Island	Deadman's Island
Baker Islands	Crow Island
Cluster Island (one of two remain)	Hog Island
Black Island	Montgomery Island
Pike Island	Mingo Island
French Island	Clines Island
Willow Island	Six Mile Island
Belleville Island	
Goose Island	
Oldtown Island	
Letart Island (one of two remain)	
Raccoon Island	
Upper Sister Island	

At least four islands were modified by natural forces. Grape and Bat Islands were "fused" through sedimentation. A palustrine wetland complex now exists within the area between the two islands. The island complex is called Grape Island but some references are noted as Grape (Bat). Goose Island, formally located between mile 230 and 231, apparently disappeared through sedimentation and a shift in the flow direction of Mill Creek. Upper Brothers Island, or French Island, may have experienced the same fate. Of the 40 existing islands between Pittsburgh - Pennsylvania (mile 0) and Meldahl Dam (Mile 437), five have been heavily urbanized and/or industrialized (Brunot, Davis, Neville, Wheeling, and Browns). Boggs Island has been extensively disturbed in recent years.

### *Land Use*

Islands in the Ohio River have been and are currently used for a variety of purposes. The acreages associated with lands owned by the Refuge was shown in Chapter 1 (Figure 2). Acreages associated with the remaining islands, but not owned by the Refuge, is shown in Figure 3. Evidence of past Indian encampments, farming, logging, commercial dredging, mooring, construction, and oil drilling may be found. Indian artifacts and middens were observed on most of the islands. These islands were undoubtedly inhabited by Indians attracted by the rich farmland and plentiful fish and game. Agriculture and silvicultural activities occurred on all islands. Commercial dredging, mooring, or other construction has taken place around most of the islands. Belleville, Pike, Montgomery, and Willow Islands were eliminated by construction of their respectively named high-lift navigation dams. Oil drilling and loading operations are evident on Mill Creek, Grandview, Wells, and Muskingum Islands.

Evidence of past agricultural use can still be seen on Williamson, Middle, Marietta, and Neal Islands. No recent silvicultural operations are known. No active human residences are maintained on any of the islands. The head of Blennerhassett Island is maintained as a major historical and recreational attraction by the State Historic Park Commission. Past industrial activities include: water wells (Eureka, Neal, Blennerhassett), gas/oil and water wells (Middle), stockpiling (Williamson), spoil disposal (Manchester No. 1, Boggs), commercial sand and gravel dredging (potentially all), and mooring (Williamson, Eightmile, and Boggs). All of the islands have been threatened by sand and gravel dredging operations.

### *Recreational Use*

The Ohio River, its islands and embayments, offer a wide range of outdoor settings, from relatively secluded areas to the bustling interface of towns and cities. Recreational use reflects seasonal opportunities and locations for specific activities. Some of the most popular public uses currently include fishing, pleasure boating, water-skiing, beach use, wildlife observation, and hunting. Gradual improvements in water quality and public access have helped create an atmosphere of increased interest in the river. However, many people remain skeptical about engaging in activities that bring them into direct contact with the water.

<b>Parcel Name</b>	<b>Land</b>	<b>Underwater</b>	<b>Total</b>
<i>Babbs Island</i>	38.1	66.2	104.3
<i>Cluster Island</i>	17.2	146.4	163.6
<i>Upper Griffen Island,</i>	7.3	205.3	480.9
<i>and Lower Griffen Island</i>	3.9		
<i>Browns Island</i>	264.4		
<i>Upper Twin Island,</i>	2.9	125.3	142.8
<i>and Lower Twin Island</i>	14.6		

<i>Boggs Island</i>	14.6	56.9	71.5
<i>Fish Creek Island</i>	48.3	86.4	134.7
<i>Eureka Island</i>	24.7	65.3	90.0
<i>Vienna Island</i>	33.7	60.4	94.1
<i>Blennerhassett Island</i>	515	215.6	730.6
<i>Newberry Island</i>	5.3	58.7	64
<i>Mustapha Island</i>	25.3	101.5	126.8
<i>Eightmile Island</i>	18.2	104.4	122.6
<i>Gallipolis Island</i>	5	70.5	75.5
<i>Lesage Island</i>	20.5	--	20.5
<i>Brush Creek Island</i>	25	146.6	171.6
<b>SUBTOTAL FOR</b>			
<b>NON-REFUGE ISLANDS</b>	1,084.0	1,509.5	2,593.5

About two-thirds of the area's fishing takes place at dam tailwaters, although many islands and embayments offer productive fish habitats that also attract anglers. Sedimentation in embayments and an apparent decrease in non-native largemouth bass in the upper river in recent years have generated concern from bass anglers and organizations sponsoring bass tournaments. Nevertheless, fishing use levels remain relatively steady since the Ohio Division of Wildlife conducted surveys in 1992 and 1993. At that time, fishing pressure for a 491-mile stretch of river was estimated at 2.5 million angler hours for both years. Some popular game species include the black basses, white bass and hybrids, catfish, crappie, walleye and sauger. Fishing occurs during the daytime and at night on the river.

Pleasure boating, including the use of jet skis, and water-skiing are increasing in popularity, with some access areas congested during summer weekends. Parking areas have been expanded or improved at ramps such as in Belpre, Ohio and Paden City, West Virginia. Although most recreational boaters do not lock through from pool to pool when on the river, recreational boat locking data collected at the Willow Island locks reflects an increasing use trend of boats on the river:

**Year (# ) of recreational boats locking through at Willow Island**

**1993 1486**

**1995 1391**

**1996 1348**

**1998 1688**

**1999 1820**

Some of the boating on the Refuge is incidental to travel required to go from one place to

another, but potential impacts to Refuge resources can occur as noise and visual disturbance to wildlife and erosive wave action. Other boaters specifically use the Refuge as a place to temporarily moor while engaging in beach activities such as picnicking, swimming, and sunbathing.

Sandy beaches flank many of the river's islands, particularly on sides facing navigation channels. Illegal uses of the beaches have decreased markedly on some Refuge islands such as Phillis, Paden, Williamson, Grape, and Manchester #2 during the past five years, as evidenced by staff observations and vegetation growth. Although these are not Refuge priority public uses, the information signs posted on the island and the Refuge brochure states that picnicking, swimming, and sunbathing are among those activities that are currently permitted. Future uses on Paden and Williamson Islands could increase in the future due to increased development, such as campsites, nearby. Beaches also occur along the mainland shores, but many of these areas are privately owned or largely unavailable to visiting recreationists.

Participation in activities such as wildlife observation and photography are becoming more popular on the river. Bird watching tours are chartered with at least one commercial sternwheeler service. The varied habitats on the river and its islands and embayments and the wildlife response to improved environmental conditions offer the potential for growth in this type of recreation.

Designated sites for wildlife watching are limited, although the Refuge has two "Watchable Wildlife" sites described in the West Virginia Viewing Guide (one on road-accessible Middle Island, and the other on boat-accessible Muskingum Island). A wildlife viewing blind and trail were developed on Middle Island in 1999, providing a targeted area for this activity.

Hunting opportunities draw hunter interest to the river for white-tail deer, waterfowl, and small game such as rabbits and squirrels. Refuge purchase of islands has expanded hunting opportunities for the public. Islands once closed to all hunting or limited to a landowner and those with special permission now provide the same access to everyone. Some Refuge islands currently remain closed to hunting because of safety issues (usually related to proximity to developed portions of the mainland). Archery deer and waterfowl hunting receive the most participation, and are increasing with additional Refuge property acquisitions, although pressure remains light.

Environmental education opportunities are increasing on the river, both on the Refuge and off. Refuge staff have worked with educational interests in Marietta, Ohio and in West Virginia to meet some of the demand.

#### **4. Management Direction**

The Service manages fish and wildlife habitats considering the needs of all resources in

decision-making. A requirement of the Refuge Improvement Act is to maintain the ecological health, diversity, and integrity of refuges. The refuge is a vital link in the overall function of the ecosystem. To offset the historic and continuing loss of riparian and forested floodplain habitats within the ecosystem, the refuge helps to provide a biological "safety net" for migratory non-game birds and waterfowl, threatened and endangered species, and other species of concern.

The goals of Ohio River Islands National Wildlife Refuge translate the stated Refuge purpose into management direction. To the extent practicable, each goal is supported by measurable and achievable objectives with strategies needed to accomplish them. Objectives are intended to be accomplished within 15 years, although actual implementation may vary as a result of available funding and staff.

One table at the end of this chapter summarizes the management direction (Figure 4), while another summarizes the potential consequences of implementing it as related to the identified issues (Figure 5).

### **Refuge Management Direction: Goals and Objectives**

This plan combines increased management actions that address habitat, fish and wildlife, and public use needs, and proposes staffing levels and facilities which are adequate to do the job. We have aspired to reflect a balanced approach to management, with greater focus on compatible wildlife-dependent uses, ecosystem priorities, and restoration and conservation of biodiversity.

**Goal 1: Preserve and restore wetland, riverine and riparian habitat in order to maintain a natural abundance and diversity of native species which are endemic to the Ohio River floodplain (with emphasis on trust resources, endangered and threatened species, and other species of concern).**

### *Discussion*

The major habitat problems which plague the islands are erosion and the invasion and establishment of exotic plants (i.e., Japanese knotweed, sachaline, purple loosestrife, multi-flora rose, garlic mustard, honeysuckle, mile-a-minute, and other exotics). Habitat management on the Refuge will emphasize the diversity and abundance of fish and wildlife species that are characteristic of the Ohio River floodplain. Historic wetlands will be restored on Refuge lands and on adjacent or nearby private lands through willing cooperation with other landowners. Bottomland hardwood forests will be restored through native tree plantings and exotic species control. Tree plantings include native floodplain species such as: pin oak, swamp white oak, black walnut, butternut, buckeye, black willow, shumard oak, American chestnut, hickories, black cherry, American plum, persimmon, cottonwood, hackberry, green ash, and sycamore. In addition, spice bush, pawpaw, dogwood, and other native berried shrubs are being planted to increase habitat and structural diversity. There will also be natural openings in the forest. Eroding shorelines will be stabilized using longitudinal dikes of vegetation or hard material (logs,

rock, etc.). Coordination with the U.S. Army Corps of Engineers will be necessary for placement of material in river, and the Refuge will submit pertinent applications at the appropriate time.

Bottomland hardwood forest is the principal habitat targeted for restoration because it is the most important and limited habitat type in the area. Prior to colonial settlement and the westward expansion, the Ohio River was a free-flowing, relatively shallow river with numerous islands, gravel bars, channel wetlands, and adjacent overflow sloughs and oxbows surrounded by bottomland hardwood forests. Much of the floodplain has been settled, cleared, drained, farmed and developed, resulting in the outright loss of habitat and the fragmentation of that which remains. Between 1800 and 1970, approximately 1,235,000 acres or 65% of the forested floodplain habitat was lost or converted to other uses (Ohio River Basin Commission, 1978). These losses have reduced habitat for many species of fish and wildlife, including federally and state listed species which depend on intact floodplain forest. Of the 20 species of birds on the West Virginia Partners in Flight Priority list, 16 of them are birds of principally forested habitats (WV Partners in Flight, 2000), which regularly use the floodplain of the Refuge.

The Ohio River Ecosystem Restoration Study Report identifies a number of restoration strategies and opportunities, including the restoration of 25,000 acres of bottomland hardwood forest and 25,000 acres of wetlands (U. S. Army Corps of Engineers, 2000). All of the resource agencies from states adjacent to the Ohio River participated in development of the resource issues, restoration goals and opportunities. The Refuge is contributing toward riverwide environmental restoration objectives by its active reforestation and wetland restoration efforts.

Most of the targeted wetlands for restoration are riverine wetlands. Restoration of riverine wetlands (submerged and emergent) involves stabilization of shorelines (to catch failed soils and disperse boat wake energy), direct planting of some species and "volunteering" of others where seed or rootstock is already present in the system. While we will not limit ourselves to average only two acres per year, many of these riverine wetlands are narrow, linear features which require much effort to gain two acres overall.

Although the refuge has no direct control of water levels in the river, it will advocate to the Corps of Engineers the resource benefits to be gained by water level management which mimics natural hydrological cycles. In addition, the refuge will cooperate with local landowners and other partners to improve habitat conditions in the watershed, which will benefit the habitat quality of the river and embayments.

While the Refuge will continue to gather data on exotic species on refuge lands, staff estimate 600 acres of invasive plants already on the refuge, and expect control of this important problem on existing properties within 20 years. Exotic plants will be managed through chemical means (direct application of herbicides), repetitive mowing and cutting where applicable, and, if available, biological control.

Wildlife management activities will include re-introduction of species which have been

extirpated (provided their habitat requirements are met); supporting captive rearing of endangered or imperilled mussels; and control of animals which are creating habitat or public health problems by hunting, trapping and/or deterrence. The re-introduction of extirpated native fish and mussel species will be coordinated with state resource agencies. The Refuge will cooperate with state resource agencies to evaluate which species might be appropriate, whether habitat conditions can be met, if genetics issues need to be examined, and what funding may be required to implement a re-introduction program.

The Service will allow trapping for management purposes, and the Refuge anticipates developing a Furbearer Management plan by 2004. Trapping is well documented as an effective and accepted practice to protect the health and populations of furbearers, and to control certain populations (such as beaver, muskrat, raccoon, etc.) when they become a problem for habitat, other wildlife, or public health (NFRTC 1996). The trapping program will be similar to those of other refuges. Permits for selected areas will be issued to a limited number of participants to meet both habitat objectives and public health and safety concerns. Trappers may be members of the public, clubs, professionals, or even a youth education program.

The Service will erect nesting boxes as an environmental education activity and as a temporary habitat deficiency measure until mature forest habitat occurs. The majority of boxes will be placed at natural densities on those islands lacking mature bottomland hardwoods which are targeted for reforestation.

Land acquisition and protection is a foundation of our National Wildlife Refuge System. Without the appropriate types and amounts of habitat, the numbers of fish and wildlife species would be greatly reduced. Current Service policy is to acquire land only: 1) from willing sellers, as funds become available; and 2) when other means to achieve program goals are not appropriate or effective. The Service's Land Acquisition Priority System (LAPS) will serve as the principal tool for ranking acquisition proposals. The Service's immediate focus will be on the protection and purchase of the remaining islands of interest. We will detail all future land acquisition strategies in a forthcoming Land Protection Plan (LPP) and Environmental Assessment. The LPP will focus on embayment and wetland areas previously identified in the Draft CCP/EA to be considered to add into the Refuge's boundary.

1. Restore an average of 50 acres annually of floodplain forest through plantings of native bottomland hardwoods.
2. Control or eradicate an average of 30 acres of invasive plant species annually through mechanical, chemical, and biological techniques and evaluate their effectiveness.
3. Between 2001 and 2010, acquire or protect (through fee title purchase, donation, or easement) 2,537 acres of remaining islands - Fish Creek, Eightmile, Mustapha, Gallipolis, Brush Creek, Neal, Newberry, Halfway, Lower Sister, Manchester Island in-holdings, Blennerhassett, and possibly portions of Eureka and Brown.
4. Continue mussel quarantine and support captive rearing program.
5. In coordination with state resource agencies, re-introduce fish and mussel species

which have been extirpated from the Refuge.

6. Install, monitor and maintain 80 prothonotary warbler nest boxes, 60 wood duck nest boxes, and 10 butterfly and bat boxes, and evaluate their effectiveness.
7. Install an average of 1 linear mile annually of longitudinal dikes and/or vegetative waddles for shoreline stabilization and re-vegetation.
8. Re-vegetate/restore an average of 2 acres per year of wetland habitat (riverine aquatic bed, riverine emergent and/or palustrine emergent).
9. Where feasible, manage water levels on Refuge wetlands to mimic natural fluctuations, and promote aquatic and wetland vegetation.
10. Using a watershed approach, restore the habitat of selected areas with willing partners, including applicable state, local, and federal agencies.
11. Work with the Corps of Engineers to provide erosion protection and rehabilitation of islands.

**Goal 2: Collect sufficient biological data so that informed management decisions may be made for enhancing or controlling priority wildlife or plant populations.**

*Discussion*

The principal species of management concern will be migratory birds and endangered species (including mussels). Monitoring studies on the Refuge will concentrate on these groups of wildlife. New surveys will be implemented (if funding and staffing permit) for mammals, reptiles, amphibians, plants, fish, insects and other invertebrates. Habitat conditions will be monitored by interpretation of aerial photography, and "on the ground" monitoring of vegetative responses to management activities. Specific details on the scope of monitoring, techniques to be used, data analysis and reporting will be addressed further in the step-down Wildlife Inventory Plan and Habitat Management Plan. The Refuge will coordinate and share data with state resource agencies, and will welcome receipt of similar data.

1. Continue baseline surveys of new acquisitions, and monitor populations of native mollusks every five years.
2. Annually track the status (e.g., distribution and densities) of zebra mussels and their impact on native freshwater mussels at 10 sites.
3. Survey Refuge properties for the presence of endangered Indiana bats (*Myotis sodalis*) during the summertime.
4. Implement species surveys and inventories for plants, fish, insects, mammals, invertebrates, reptiles, and amphibians on Refuge properties.
5. Conduct cover-type mapping for all Refuge properties prior to the year 2003, and incorporate data into a GIS system.
6. Monitor vegetation response to habitat management.
7. Conduct baseline breeding bird surveys of migratory land birds of concern to determine species richness, relative abundance, and average population densities, and monitor every 5 years thereafter.
8. Track annual changes in migratory bird populations and species composition in response to management actions and natural succession by employing breeding



- bird survey techniques.
9. Conduct annual mid-winter bald eagle survey (29-mile route in Willow Island Pool).
  10. Monitor osprey nests on the Refuge annually.
  11. Monitor the status of heron rookeries on Refuge properties annually.
  12. Implement annual wood duck banding program (in coordination with applicable state agencies) with a minimum target of 100 birds each year.
  13. Implement a semi-monthly winter waterbird survey.
  14. Document causes and trends of Refuge island erosion.

**Goal 3: Promote and support priority compatible fish and wildlife-dependent uses while maintaining the long-term health of the ecosystem and Service trust resources.**

*Discussion*

One of the major intentions of the Refuge System is to provide Refuge visitors with high-quality, safe, and enjoyable recreational experiences oriented toward wildlife, to the extent these activities are compatible with the purposes for which the Refuge was established. Wildlife conservation is the primary focus of the Refuge - opportunities for compatible recreational uses are important benefits that flow from this focus.

Limited accessibility affects all public uses found on the Refuge. Only certain portions of the Refuge are located on the mainland -- Buffalo Creek, Buckley Mainland and Captina Mainland. Middle Island (near St. Mary's, WV) and Wheeling Island (at Wheeling, WV) are connected to the mainland by bridges. The remaining refuge islands are only accessible by boat. Access to Buckley Island may be available through a sternwheeler company located in Marietta, OH. We will also add carry-down boat access points that could allow visitors to transport canoes or small boats into the river near adjacent refuge islands at two or three locations (e.g. Buffalo Creek, Buckley mainland, Muskingum Island backchannel).

All refuge properties will remain open daily to visitors, free of charge, from one hour before sunrise to one hour after sunset. Wildlife-dependent activities such as fishing, hunting, nature study, photography, environmental education, and wildlife observation will be encouraged.

All Refuge lands and waters will be available to sport fishing. The Service recognizes sport fishing as an acceptable, traditional form of wildlife-dependent recreation. Recreational fishing opportunity on Refuges is also consistent with, and an important implementation tool for, the Service's National Recreational Fisheries Policy. Refuge anglers will be required to comply with all applicable State fishing regulations while fishing Refuge waters, including licensing requirements.

Additional opportunities for fishing will be explored. We will review and update the existing fishing plan in consultation with state resource agencies, anglers and other members of the public. Such a plan would be accomplished with consideration and

analysis of the demands and impacts of additional access points, bank fishing at night on refuge lands, and opportunities for expanded fishing in acquired embayments and on islands. Also, we must define the conditions that are necessary to keep such fishing activities and programs compatible with refuge purposes and the System.

A special Refuge fishing brochure will provide anglers with more information about fishing opportunities. The Service does not set fishing regulations (e.g., allowable species, number and size limits, and seasons), and does not propose to do so. The Refuge does set Refuge public use conditions (e.g., Refuge open hours, no woodcutting, and no fires). Thus, the Refuge does not, and will not, set "fishing" regulations.

The Service recognizes hunting as an acceptable and legitimate form of wildlife dependent recreation as well as a management tool to effectively control certain wildlife population levels (e.g. deer). The decision to permit and manage hunting on a National Wildlife Refuge is made on a case-by-case basis by the Refuge Manager, and considers biological soundness, economic feasibility, effects on other Refuge programs, safety and public demand. Current demands and opportunities for the public to hunt in the vicinity of the Refuge are evaluated to determine the impacts a Refuge hunt would have on the overall opportunities in the area. Hunting on the Refuge must be coordinated with other public uses to minimize potential conflicts, and care is taken to ensure that adverse impacts to other wildlife, particularly threatened and endangered species, do not occur.

Refuges use Service administrative procedures and guidelines found in the FWS Refuge Manual to manage hunting programs. Section 8RM 5.5 states:

"Refuge hunting programs should be planned, supervised, conducted, and evaluated to promote positive hunting values and hunter ethics such as fair chase and sportsmanship. In general, hunting on Refuge lands should be superior to that available on other public or private lands and should provide participants with reasonable harvest opportunities, uncrowded conditions, few conflicts between hunters, relatively undisturbed wildlife, and limited interference from or dependence on mechanized aspects of the sport. This may require zoning the hunt unit and limiting the number of participants. Good planning will minimize the controls and regimentation needed to achieve hunting objectives."

Although the overall demand for *expanded* hunting opportunities (above what is currently offered) was found to be low at the majority of public meetings and workshops held in preparation for this plan, the Refuge will offer and promote additional hunting opportunities through land acquisitions. Hunting is permitted on most Refuge properties (87% in 2001), with some special regulations in effect for safety and to ensure compatibility. Refuge hunting will include deer; waterfowl; other migratory game birds including coots, rails, gallinules, snipe, woodcock, and dove; rabbit and squirrel. Deer and waterfowl hunting will receive emphasis, as these uses are of equal or greater demand on Refuge lands than other types of hunting.

Deer hunting on the Refuge remains primarily restricted to archery due to safety considerations. The Refuge will coordinate with biological staffs of state resource

agencies to discuss logistics of an expanded deer hunting program (i.e., such as primitive weapon use where appropriate, safety issues, hunter density, permit system, sign needs, enforcement).

Migratory bird, rabbit, and squirrel hunting is restricted to shotgun. Non-toxic shot is required for all shotgun hunting on the Refuge. The possession of lead shot in the field by Refuge hunters is prohibited.

Dogs (e.g. retrievers and pointers) may be used during migratory bird hunting but must be kept under control and leashed when not in use. The use of pursuit dogs for any type of hunting is prohibited. All of the studies reviewed by refuge staff showed that dogs can and do chase deer and other wildlife; pursuit dogs can and do range far on a chase (0.2 - 13.4 miles), and most of the deer chased (>70%) left their home range for a day or more at a time (Progulske and Baskett, 1958) (Sweeney et al. 1971) (Corbett et al. 1971). Regardless of domestication, dogs are predators which maintain basic instincts to chase and hunt, and the predictability of their disturbance is diminished when they are off-leash (Sime 1999). The refuge has documented dogs off-leash killing wildlife on the refuge. Dogs off-leash increase the effective range of human disturbance to wildlife. The presence of sensitive habitats, areas of significant wildlife concentrations, and/or competing public uses would all be subject to disturbance by the use of pursuit dogs. In addition, the effect of free-running dogs on adjacent landowners and neighbors is considered in the compatibility determination. Given that refuge habitats are mostly small in size and close in proximity to wetland and aquatic habitats which support federal trust resources in fall and winter, and deer and waterfowl hunting and wildlife observation are concurrent public uses which would be adversely impacted by free-running dogs, the use of pursuit dogs on this Refuge is incompatible.

Considerable interest and demand has been shown for environmental education, and interpretative programs and activities. This plan calls for the Refuge to include a visitor contact station and environmental education wing with the construction of a new headquarters facility. An annual teachers workshop will be sponsored by the Refuge to familiarize educators with a curriculum and activities pertinent to the Refuge.

Strategies will focus on educating the public about responsible stewardship and threats to river resources. The Refuge will regularly sponsor special events such as guided walks and programs and offer additional sites that provide interpretive signing or brochures (trails, boat route, and auto tour).

With partners, the Refuge will also attempt to enhance public appreciation of Ohio River wildlife resources by installing interpretive signs at other off-Refuge locations.

The Refuge will take an active role in providing and maintaining sites and trails from which the public can view, study and photograph nature. Furthermore, the Refuge will expand public opportunities to enjoy and learn more about the wildlife resources of the Ohio River Valley (and the Refuge) through photography workshops, contests and an additional wildlife viewing blind.

The Service will evaluate all Refuge activities according to Refuge objectives. Wood fires, mowing and tree cutting will not be permitted because of damage to wildlife habitat. Permanent structures such as boat docks, stairways, shelters, rope swings, and water slides will not be allowed. All night uses, including camping and boat mooring, will not be permitted.

There is a possibility that the number of boaters may increase, but not to a significant degree above existing levels. The Service assumes additional use of refuge islands would be redistributed from existing boaters towards Refuge activities. Increases in overall boating activity will likely be associated with non-wildlife dependent activities.

Although uses other than wildlife-dependent recreational activities occur on and near the Refuge, no facilities or programs are provided by the Refuge for their use. Bicycling and jogging on the Middle Island road, and picnicking and recreational boating are among those uses that occur; however, at their present locations and intensity they are not deemed incompatible with Refuge purposes or Service guidelines.

#### General

1. Open Refuge for public use from one hour before sunrise until one hour after sunset daily (generally all of Refuge, exclusions as needed).
2. Distribute annually 9,000 Refuge primary brochures and fact sheets containing information about priority public uses and Refuge lands available for those uses.
3. Through an Internet web site, provide information about Refuge priority public uses by 2002.
4. As part of all land acquisitions, distribute news releases to local media highlighting priority public use opportunities available to visitors.
5. Maintain seven on-site Refuge informational kiosks at locations with high public use and install at least one additional kiosk per year, depending on land acquisitions.
6. In cooperation with partners, install eight strategically located Refuge informational kiosks at off-Refuge locations such as boat ramps.
7. Offer and promote at least six special events annually targeting Refuge priority recreation (e.g. International Migratory Bird Day, 4<sup>th</sup> of July Butterfly Count, nature photography workshop).
8. Coordinate with local ferry service to provide access to Buckley Island during summer months.
9. Provide carry down boat access at 2 to 3 locations.

#### Hunting

1. Promote hunting on Refuge for deer, migratory game birds, rabbit, and squirrel, with special Refuge regulations in effect.
2. Distribute annually 1,500 Refuge hunt brochures providing information about deer hunting, waterfowl and other migratory birds, rabbit, and squirrel hunting opportunities on the Refuge.
2. Annually announce through news releases to local media information about

- hunting opportunities and season openings on Refuge property.
3. As part of all land acquisitions, provide through news releases information about hunting opportunities specific to each acquisition.
  4. Offer an accessible deer hunting opportunity on Middle Island by 2003, and evaluate mainland properties for other accessible hunting opportunities (e.g. waterfowl).
  5. Develop and promote youth deer and waterfowl hunts by 2003.
  6. By 2003, install a barrier-free hunter access blind on Refuge property.
  7. Provide hunting information through posted notices and news releases identifying Refuge hunting and non-hunting areas to reduce potential user conflicts.
  8. Work with state departments of natural resources to promote hunting programs for women and youth.

### Fishing

1. Develop and distribute 5,000 Refuge fishing guides (with state agency input) by 2003.
2. Design and construct one accessible fishing pier on the Refuge by 2003.
3. Participate annually in National Fishing Week activities in cooperation with other state and federal agencies.
4. In consultation with state resource agencies, anglers and other members of the public, initiate review and update of the existing fishing plan in 2003. This will be accomplished upon completion of the Land Protection Plan (LPP), and with consideration and analysis of the demands and impacts of additional access points, bank fishing at night on refuge lands, opportunities for expanded fishing in acquired embayments and on islands.

### Environmental Education

1. Work with local educators to develop and provide a curriculum of Refuge-based activities targeting students in grades 3-12 by the year 2003.
2. Provide an annual teachers workshop by 2004.
3. Provide two outdoor education sites designed to compliment Refuge-based environmental education activities by 2004 (at Middle and Buckley Islands).
4. Coordinate with local commercial ferry service and educators to provide access to Buckley Island for teacher-led environmental education activities (outside of hunting seasons).

### Interpretation

1. By 2010, provide three on-site interpretive trails at locations targeted to meet the demands of population concentrations near the Refuge (such as Middle Island, Buckley Island, Wheeling Island, etc.)
2. Implement a self-guided wildlife boat tour at Muskingum Island by 2002, and another in the Willow Island Pool by 2005.
3. Maintain interpretive auto tour on Middle Island, and implement another in a

road-accessible embayment by 2010.

#### Wildlife Observation and Photography

1. Install a wildlife observation blind with barrier-free access on Middle Island by 2002 and an additional 1-2 blinds or platforms at other Refuge locations by 2010.
2. Provide annual wildlife photography workshops.
3. Offer an annual Friends Group-sponsored wildlife photography contest by 2003.
4. Provide a portable wildlife viewing blind for Refuge visitor loan through a Refuge Friends group by 2003.

#### **Goal 4: Raise public awareness of the values of the islands, embayments, and wetlands of the Ohio River.**

##### *Discussion*

Public awareness and appreciation of the Ohio River's floodplain habitats is a crucial link in building public support for the Refuge and its activities. Limited public access to refuge islands and other properties increase the need for off-refuge outreach to build this support. The Service has identified communities, conservation organizations, and the media among the key audiences for Refuge outreach efforts.

Community outreach through presentations to civic and other groups will occur more frequently, reflecting the need to reach additional communities. The refuge will increase its participation with conservation organizations and state agencies to offer special events and programs that highlight shared resource concerns. Contacts with the media will expand to include additional media markets. A Refuge Web site is in development and will include information about important habitats.

An active volunteer program is designed to directly involve residents of the local communities with Refuge programs and projects, and will expand. More student interns will also be recruited from local colleges.

1. Provide presentations to civic, professional, and other groups highlighting the values of and issues concerning the habitats and wildlife resources associated with the Ohio River's floodplain (approximately 20 - 25 per year).
2. Provide information about the values of the islands, embayments, and wetlands of the Ohio River on the Internet through a Refuge web site by 2002.
3. Solicit local media coverage of Refuge activities concerning habitat restoration and improvement projects (approximately two television interviews, two radio interviews, five newspaper articles and one magazine article per year).
4. Participate in off-Refuge special events (approximately five per year such as WV DNR Non-Game Wildlife Day, National Fishing Week) with exhibits highlighting Refuge wildlife resources.
5. Provide assistance for off-site environmental education when requested (approximately once a year).

6. Develop a wildlife interpretive sign (similar to one developed in partnership with the Marietta Natural History Society) for placement at a non-Refuge site along the Ohio River by 2005.
7. Promote Refuge volunteerism through active solicitation of 2-3 student interns per year and outreach to groups and individuals (approximately 300 volunteers/2,000 hours per year).
8. Develop a mobile Refuge education/outreach unit for use on and off the Refuge.

**Goal 5: Support the needs and staff of the Ohio River Islands NWR with sufficient staff, facilities, and equipment to fulfill the station's approved plan.**

*Discussion*

The Ohio River Islands NWR office is located at the side of a small shopping mall at 3004 7<sup>th</sup> Street in Parkersburg, West Virginia, with no visibility from the main highway. The Refuge office is a GSA rental unit. It is neatly kept, and decorated with wildlife-related materials. However, the current office location is not in a natural setting near the Refuge itself. Since its inception, the Refuge has lacked visibility, primarily due to its present location. Thus, it is necessary to construct a new 8,000 square foot Refuge headquarters, which we anticipate to be located on the Buckley Mainland property. (The Buckley mainland site is considered to be a viable option as it is one of the very few Refuge owned properties that is not located within the 100-year floodplain.) The headquarters would include office space for Refuge personnel, a maintenance shop, a storage facility for Refuge vehicles, boats and equipment, and a visitor contact station/educational wing. Additional equipment will be purchased to support an expanded habitat restoration program. The Refuge will secure temporary (or permanent housing) quarters for volunteers and temporary staff.

Additional staff will be hired to carry out expanded plans and goals for habitat restoration, environmental education, outdoor recreation and biological surveys. A total of 13 positions would be funded by the Service to carry out the Refuge mission. The annual Refuge budget will increase to support the Refuge staff, expanded Refuge programs, and involvement in the Ohio River Valley Ecosystem.

Boundary sign maintenance will continue to be a major task. Factors including high water, vandalism, and lush Japanese knotweed growth make periodic inspection, replacement and weed clearing a necessity.

Ohio River Islands NWR will continue to provide technical assistance and cooperation within the Ohio River Valley Ecosystem Team to the extent practicable. Volunteers will continue to be required for assistance in fulfilling the Refuge's mission and goals. Habitat restoration is anticipated to receive the most assistance.

The Service can enter into cooperative partnership agreements with private organizations to carry out restoration habitats for numerous purposes, including the recovery of Federally listed species, water quality improvements, and the enhancement of aquatic

habitat and aquatic resources. The Partners for Fish and Wildlife funding will allow non-profit organizations to form additional restoration partnerships with other agencies and local landowners. The North American Wetlands Conservation Act also provides grant funding for land acquisition and restoration. The state resource agencies of Pennsylvania, Kentucky, West Virginia and Ohio will be considered partners, and utilized at every opportunity.

1. Establish a Refuge "Friends Group" by 2003.
2. Construct a visitor contact station/education wing with a new Refuge headquarters by the year 2006.
3. Maintain boats, automobiles, and farm equipment to the highest standards to effectively fulfill the mission of the Refuge.
4. Secure temporary quarters for volunteers and seasonal staff.
5. Foster partnerships with state agencies and local law enforcement personnel for monitoring and protecting Refuge properties.
6. Utilize the following staff to fulfill the mission of the Refuge:
  - Refuge Manager
  - Deputy Refuge Manager
  - Administrative Support Assistant
  - Office Clerk
  - Refuge Biologists (2)
  - Biological Technicians (1)
  - Outdoor Recreation Planners (2)
  - Maintenance Workers (2)
  - Park Rangers with law enforcement capabilities (2)

### **Alternatives Considered, but eliminated from detailed study**

Through the public scoping process, the interdisciplinary team arrived at four alternatives that were evaluated in the Draft CCP/EA. Other actions and alternatives were discarded during the analysis process.

*Custodial Management.* This alternative would minimize Refuge management, providing only those activities mandated by policy or regulation, such as exotic or invasive plant control, providing for public health and safety, or protecting threatened or endangered species. Public use opportunities would be drastically reduced, or eliminated on most Refuge lands, commensurate with reduced staffing and budgets. The Service's presence in the communities would be minimal. Under this alternative, resource issues would not be resolved, nor would Refuge goals and objectives be accomplished.

During our public scoping , a few individuals wanted a much reduced Service presence or no presence at all, primarily because it imposed on their non-wildlife dependent activities. While these comments were noted from only a few individuals, we did not otherwise hear recommendations for a custodial approach to management and, as such, we determined it did not need to be evaluated in detail.



### *Special Management Designation*

A wide variety of special land designations currently overlay national wildlife refuges. For most special management areas, responsibility (for authority for designation) is held by or shared by others. The Wilderness Act of 1964 directs the Secretary of the Interior to review, within ten years, every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend suitability of each such area. The Act permits certain activities within designated Wilderness Areas that do not alter natural processes. Wilderness values are preserved through a "minimum tool" management approach which requires refuge managers to use the least intrusive methods, equipment and facilities necessary for administering the areas.

Among the other special management areas found on refuges are Research Natural Areas, Wild and Scenic Rivers, National Natural Landmarks, and National Trails.

Ohio River Islands Refuge does not have any properties suitable for Wilderness Designation. There are no tracts of at least 5,000 contiguous acres., and some of the islands do have roads (i.e., Middle, Wheeling). However, while most of the islands are roadless, they do not fit the other criteria. The islands have been logged, farmed, built upon, drilled for oil and gas, and are located in a series of pools artificially impounded for commercial navigation in one of the busiest inner-waterways in the United States. The islands do not always offer opportunities for solitude or primitive unconfined recreation due to the fact that commercial barge traffic, recreational boating and waterskiing occur adjacent to the islands. Many of the islands are located within or immediately adjacent to populated cities (i.e. Parkersburg, Marietta, St. Marys, Wheeling and Williamstown, to name a few).

**Figure 4 Summary of Management Actions and Strategies**

<b>Refuge Goals and Activities</b>	<b>Current Management</b>	<b>Preferred Alternative</b>
<b>Goal 1 - Habitat</b>	.	.
reforestation with native hardwoods	20 acres per year	50 acres per year
mowing, cutting, burning, and planting	none	none
exotic plant control	5 acres per year	30 acres per year
mussel quarantine and captive holding	X	X
wood duck nest boxes	60	60
prothonotary warbler		

boxes	50	80
bat and butterfly boxes	10	10
erosion protection	X	X
water level management	advocate natural cycles	manage refuge wetlands to mimic natural cycles
restore wetlands	1 acre per year	2 acres per year
longitudinal dikes/waddles for shoreline stabilization	none	1 mile per year
create snag habitat	none	X
trapping	trapping by permit	trapping by permit
acquire and/or protect additional habitat	8 islands (951 acres)	14 islands (2554 acres)
<b>Goal 2 - Biological Monitoring</b>	migratory birds and mussels	migratory birds, mussels, Indiana bat, fish, insects, mammals, plants, and cover type mapping
surveys and inventories		
zebra mussel monitoring	6 sites annually	10 sites annually
waterfowl banding	none	100 ducks annually
historic species re-introductions	none	fish and mussels
<b>Goal 3 - Priority Public Uses</b>	refuge open from sunrise to sunset daily	refuge open 1 hr. before sunrise - 1 hr. after sunset
Refuge public use hours		
"carry-down" boat access locations	0	2-3
<u>Refuge recreation information</u>	.	.
general brochures	3000	9000
	X	X

refuge Internet site	5	7
on-refuge info. kiosks	0	8
off-refuge info. kiosks		
<u>Annual special events</u>	4	6+
<u>Interpretation</u>	1.5 miles - Middle Island (Including accessible portion)	1.5 - 3.0 miles at Middle Is. + trails at two other sites
trails		
boat tour routes	1	2
auto tour routes	1	2
<u>Wildlife Observation</u>	.	.
wildlife viewing blinds	1	2
<u>Wildlife Photography</u>	nothing	annual photography workshop and contest
<u>Hunting</u>	hunting allowed for archery deer, migratory game birds, rabbit and squirrel; special refuge regs. apply	hunting allowed for archery deer, migratory game birds, rabbit and squirrel; special refuge regs. apply
special hunts	none	sponsor accessible hunt
<u>Environmental Education</u>	.	.
teacher workshops	assist with teacher workshops	sponsor teacher workshop
develop refuge curriculum & activity guide	none	X
outdoor education sites	none	2
<u>Fishing</u>	.	.
develop fishing guide	none	X
accessible fishing pier	none	1

<b>Goal 4 - Raise Public Awareness Outreach - public presentations</b>	10-15 annually	20-25 annually
Refuge Internet website	X	X
Off-refuge interpretive signs	1	2
Participate in off-refuge special events	3	5
Mobile outreach unit	none	X
Annual medial goals	1 t.v., 1 radio, 3 newspaper	2 t.v., 2 radio, 5 newspaper, 1 magazine
Refuge "Friends" group	none	X
Volunteers	200 individuals, 1-2 interns 1500 hours	300 individuals, 2-3 interns, 2000+ hours
"Naturalist Aboard Sternwheeler" Program	none	X
<b>Goal 5 - Staff and Facilities</b>	.	.
Staffing Level	6	13
Refuge Headquarters	existing GSA rental	new facility
Visitor Contact/E.E. wing	none	X
Quarters for Volunteers and Temporary Staff	none	X X

**Figure 5 Summary of Potential Impacts**

	<b>Current Management</b>	<b>Preferred Alternative</b>
<b>Primary Issues</b>  (Chapter 2, pages 15 to 17)		

<p><i>1 - Does the alternative curb erosion of islands and banks?</i></p> <p><i>Does the alternative decrease the sedimentation and siltation of shallow water embayment areas and the river?</i></p>	<p>Yes, the alternative will have a neutral to slightly positive effect on erosion. Reforestation, wetland revegetation and working in conjunction with the Corps will help, but not to the extent of the Preferred Alternative.</p> <p>Not likely. Habitat activities would help retain soil in place, but this would likely have very little effect on the river.</p>	<p>Yes, the alternative will have a slightly positive effect on erosion. Reforestation, wetland revegetation, installation of longitudinal banks, land acquisition and working in conjunction with the Corps will help hold soils in place.</p> <p>Slightly. Protection of these critical areas would help to decrease sedimentation and siltation by preventing shoreline disturbance and development, and additional habitat measures in watersheds of the embayments themselves is <i>part</i> of the solution.</p>
<p><i>2 - Does the alternative acquire or protect important fish and wildlife habitat in the area from impacts of development?</i></p> <p><i>Does the alternative stem the continuing and future loss of habitat?</i></p>	<p>Net benefit by proposing to protect eight more islands.</p> <p>Overall net benefit by restoring 20 acres annually of native floodplain forest, restoring one acre per year of wetland habitat, and decreasing turbidity and sedimentation.</p>	<p>Yes, by proposing to protect an additional 14 islands.</p> <p>Yes, by restoring 50 acres annually of floodplain forest, restoring two acres per year of wetland habitat and installing one mile of longitudinal banks per year.</p>
<p><i>3 - Does the alternative control or eradicate the introduction and spread of invasive plants and aquatic species on Refuge lands and in the Ohio River?</i></p>	<p>Slightly. Control or eradicate about five acres of invasive plants per year and annually track the impact of zebra mussels on native freshwater mussels.</p>	<p>Yes. Control or eradicate about 30 acres of invasive plants per year, annually track the impact of zebra mussels on native freshwater mussels at 10 sites, and reintroduce fish and mussel species that have been extirpated from the Refuge.</p>
<p><i>4 - Does the alternative improve access to the river and islands for the</i></p>	<p>No.</p> <p>Slightly, by construction of a .2-mile interpretive trail on Middle</p>	<p>Yes. The Preferred Alternative proposes to coordinate with the local ferry service to provide</p>

<p><i>general public?</i></p> <p><i>Does the alternative increase Refuge opportunities for people without boats?</i></p>	<p>Island, the maintenance of an interpretive auto tour on Middle Island and offering four special events per year. Refuge hours are sunrise to sunset.</p>	<p>access to Buckley Island during summer months.</p> <p>Yes, by maintaining the interpretive auto tour on Middle Island and potentially implementing another in a road-accessible embayment by 2010, and offering about six special events per year. Refuge is open one hour before sunrise to one hour after sunset.</p>
<p><i>5 - Does the alternative expand hunting opportunities?</i></p>	<p>No; hunting opportunities stay the same: archery deer, migratory birds, rabbit and squirrel. Special regulations limit dog use to retrieval purposes, limit species taken moreso than state laws, prohibit baiting for deer or organized drives for deer. Land acquisition would increase hunting opportunities. Refuge hours are sunrise to sunset.</p>	<p>Yes, mostly because Refuge is open from one hour before sunrise to one hour after sunset. Many of the same conditions as current management, but opportunities would increase as more islands are acquired. Programs available for youth, women, and hunters with disabilities.</p>
<p><i>6 - Does the alternative improve and advance environmental education in the Ohio River area for schoolchildren and the public?</i></p>	<p>No. Environmental education continues on an as-requested basis. Provide one interpretive trail, one self-guided boat tour, and one self-guided auto tour. Assist with on- and off-refuge teacher workshops but do not initiate a curriculum of activities.</p>	<p>Yes. Develop curriculum and activity guide with two outdoor education sites and an annual teachers workshop. Offer teacher-led environmental education activities on Buckley Island. Provide three interpretive trails, two self-guided boat tours, and two self-guided auto tours. Participate in off-refuge teacher workshops.</p>
<p><i>7 -Does the alternative make the general public more familiar with the Refuge's existence, regulations, mission, goals and the resources that need protection?</i></p>	<p>Yes, but not to the extent of the preferred alternative.</p>	<p>Yes.</p>

8 - <i>Does the alternative improve staffing and facilities to adequately meet the present and anticipated future needs of the Refuge?</i>	No. Staffing would remain unchanged, and a headquarters/visitor contact station is not proposed.	Yes. Staffing would be increased to handle additional duties, and a headquarters and visitor contact station is proposed.
9 - <i>Does the alternative address trapping as a use on Refuge lands?</i>	Trapping would be allowed for management purposes per Refuge permits and regulations.	Yes. Trapping would be allowed for management purposes per Refuge permits and regulations.

## 5. Implementation and Monitoring

### Background

Refuge lands are managed as defined under the National Wildlife Refuge System Improvement Act of 1997, Fish and Wildlife Manual, sound biological principles, and up-to-date research. Congress has distinguished a clear legislative mission of wildlife conservation for all national wildlife refuges which, unlike other public lands, are dedicated to the conservation of the Nation's fish and wildlife resources. Recreational values are accommodated where appropriate and compatible, while still meeting the Congressional mandates of wildlife conservation first. Priority projects emphasize the protection and enhancement of fish and wildlife species first and foremost, but consideration is given to balancing the needs and demands for wildlife-dependent recreation and environmental education.

### Step-Down Management Plans

This planning effort reflects the basic needs identified by Service staff, the public, partners and planning team members for the management of fish and wildlife populations, habitats, visitor services, general administration, land protection, and conservation. Among these projects is a list of step-down plans to be developed. Step-down plans describe the specific management actions we intend to follow, "stepping down" from general goals, objectives, and strategies. Some specific plans may need revisions, while others will need to be developed. The preparation of new step-down plans (or substantial changes to existing step-down plans) typically require further compliance with NEPA and other policies, as well as an opportunity for public review.

The Refuge System Manual, Part 4, Chapter 3, lists over 25 specific management plans that are potentially required on Refuges. Some plans require annual revisions or programs, and others are on a 5 to 10 year revision schedule.

Following is a list of required plans and a schedule for their completion:

***1) Occupational Safety and Health Plan ..... Revise by June 2002***

- (a) Safety Programs*
- (b) Safety Operations*
- (c) Flood Contingency*
- (d) Emergency Spill Response*

***2) Cultural Resources Management Plan ..... Initiate and Complete by December 2004***

***3) Habitat Management Plan ..... Initiate and Complete by December 2002***

- (a) Reforestation*
- (b) Wetland Restoration*
- (c) Shoreline Stabilization and Revegetation*
- (d) Exotic Plant Species Control*

***4) Wildlife-dependent Recreation Plan ..... Revise by June 2004***

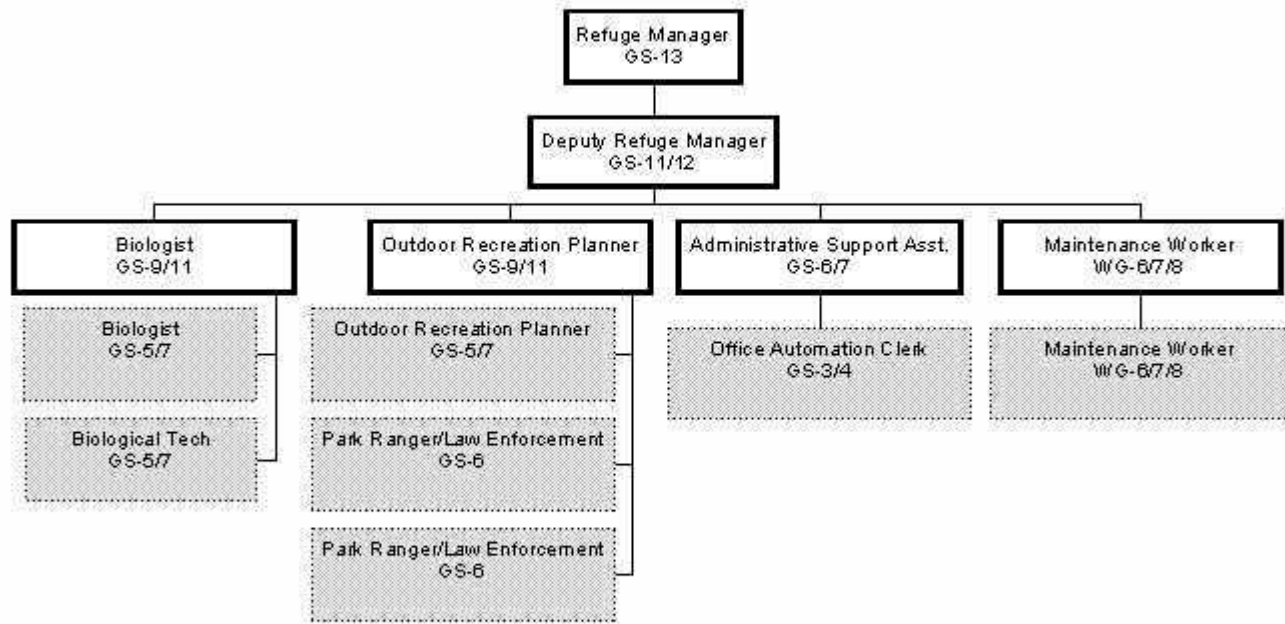
- (a) Hunting . Completed*
- (b) Fishing . Completed*
- (c) Wildlife Observation*
- (d) Wildlife Photography*
- (e) Environmental Education*
- (f) Interpretation*

***5) Law Enforcement Plan ..... Initiate and Complete by June 2003***

***6) Population Management Plan ..... Complete by June 2004***

- (a) Wildlife Inventory . In Progress*
- (b) Furbearer Management*
- (c) Nest Boxes*
- (d) Endangered Species Recovery*
- (e) Marking and Banding*
- (f) Propagation and Stocking*





*Minimum Standard: 13 FTE's -- Existing Permanent Staff: 6 FTE's(unshaded) Unfilled Positions: 7 FTE's (shaded)*

## Compatibility Determinations

The Refuge Manager will usually complete compatibility determinations as part of the comprehensive conservation plan or step-down management plan process for individual uses, specific use programs, or groups of related uses described in the plan. When we add lands to the Refuge System, the Refuge Manager assigned management responsibility for the land to be acquired will identify prior to acquisition the existing wildlife- dependent recreational public uses (if any) determined to be compatible that we will permit to continue. However, since we will not be addressing land acquisition in this document, and instead will be preparing a subsequent Land Protection Plan (LPP), Service policy

states that the compatibility determinations should be made in conjunction with the preparation and release of the appropriate pre-acquisition realty documentation, prepared pursuant to NEPA.

***Compatibility determinations in existence prior to the effective date of the compatibility policy will remain in effect until and unless modified and will be subject to periodic reevaluation.*** We will not initiate or permit a new use of a national wildlife refuge or expand, renew, or extend an existing use of a national wildlife refuge, unless we have determined that the use is a compatible use and that the use is not inconsistent with public safety.

We do not require a compatibility determination for refuge management activities as defined by the term "refuge management activity" except for "refuge management economic activities." Examples of refuge management activities that do not require a compatibility determination include: prescribed burning; water level management; invasive species control; routine scientific monitoring, studies, surveys, and censuses; historic preservation activities; law enforcement activities; and maintenance of existing refuge facilities, structures, and improvements.

## **Plan Performance**

The National Wildlife Refuge System Improvement Act requires that the Service monitor fish, wildlife, and plants on refuges in order to establish status and trends of both resident and migratory wildlife. Monitoring is an essential component of this plan, and specific strategies have been integrated into the previously described goals and objectives. All habitat management activities will be monitored to assess whether the desired effect on wildlife and habitat components has been achieved. Baseline surveys will be established for other species of wildlife for which existing or historical numbers are not well known. It also may be important to begin studies to monitor the response of wildlife to increased visitor use. Management of projects is dependent on monitoring and evaluation to sustain the function and dynamics of the forested floodplain, maintaining biological diversity, protecting target species, and providing a variety of wildlife-dependent recreation and education experiences of value to visitors. Information derived from monitoring and evaluation will enable managers to adjust and test the management objectives outlined in this plan.

This plan would be reviewed annually to determine the need for revision and adjust and set priorities. Revisions to the plan would be subject to National Environmental Policy Act review, as well as public review. Management performance is documented in annual narratives. A new plan is required after 15 years.

## **Partnership Opportunities**

Public outreach entails a variety of services and support that refuges provide to the public, special groups, other government agencies and individuals. It includes technical assistance to state agencies on special problems and publications and presentations to

local civic groups and schools. Many biologists and private citizens, as well as environmental organizations, scientific organizations and other agencies, have expressed a great interest in the management of this and other refuges. Maintaining and developing partnerships will enable the refuge to achieve its goals and objectives, minimize costs, share funding and bridge relationships with others. To maintain and enhance wildlife outside of the refuge, the Service will focus its efforts on continuing to develop partnerships with landowners, the state resource agencies, and interested conservation and sportsmen groups. Although the Service does not have management responsibilities for those lands outside the refuge, it is important to articulate the wildlife resource needs area wide. Collaboration with colleges and universities and with conservation organizations will enable the refuge to carry on its plans for research, monitoring, and education. To create awareness and expand environmental education efforts in the community, partnerships will be established or expanded with organizations and school systems.

### **Monitoring and Evaluation**

Wildlife population monitoring and habitat monitoring (as addressed in Goal 2) will be emphasized. Wildlife monitoring will include surveys during the appropriate seasons, species richness measurements, and relative abundance figures. Habitat monitoring will primarily involve the amount and distribution of habitats, vegetation surveys, community composition and structure, and representative components and habitat parameters.

Planning is a dynamic process, and this CCP (and the more specific related step-down plans) are subject to reviews and modification when appropriate. Work plans are submitted annually for funding. Further, monitoring and evaluation criteria could be established by the Ohio River Valley Ecosystem team. It would be the responsibility of the Refuge staff to complete monitoring under the time frames and conditions called for in respective plans. Effectiveness monitoring would provide the basis for an adaptive management response.

Adaptive management is a flexible approach to long-term management of biotic resources which is directed over time by the results of ongoing monitoring activities and other information. Adaptive management is a process in which projects are implemented

within a framework of scientifically driven experiments to test predictions and assumptions as outlined in this plan. The biological programs are systematically evaluated to determine management effects on wildlife populations. This information is used to refine approaches and to determine how effectively goals and objectives are being accomplished. Evaluations will be conducted on a regular basis to provide feedback to stakeholders and partners. If monitoring and evaluation yield undesirable effects for target and non-target species and/or communities, management projects will be altered and the CCP may be revised.

Monitoring and evaluation will occur at two levels. The first level, referred to herein as "implementation monitoring", responds to the question:

*"Did we do what we said we would do, when we said we would do it?"*

Implementation monitoring will be achieved annually by Refuge staff, and reported to the Regional Office. A second level of monitoring, referred to herein as "effectiveness monitoring", responds to the question:

*"Are the actions we proposed effective in achieving the results we had hoped for?"* Or, in other words,

*"Are the actions leading us towards our vision, goals, and objectives?"*

Effectiveness monitoring would be directed towards evaluating an individual action, a suite of actions, or for an entire resource program. This approach to monitoring is more analytical in evaluating management effects to species, populations, habitats, and predetermined indicators of ecosystem integrity and the socio-economic environment using evaluation criteria established in step-down, individual project, or partnership plans. Each of these plans would have a monitoring and evaluation component. It would be the responsibility of the Refuge staff to complete monitoring under the time frames and conditions called for in respective plans.